



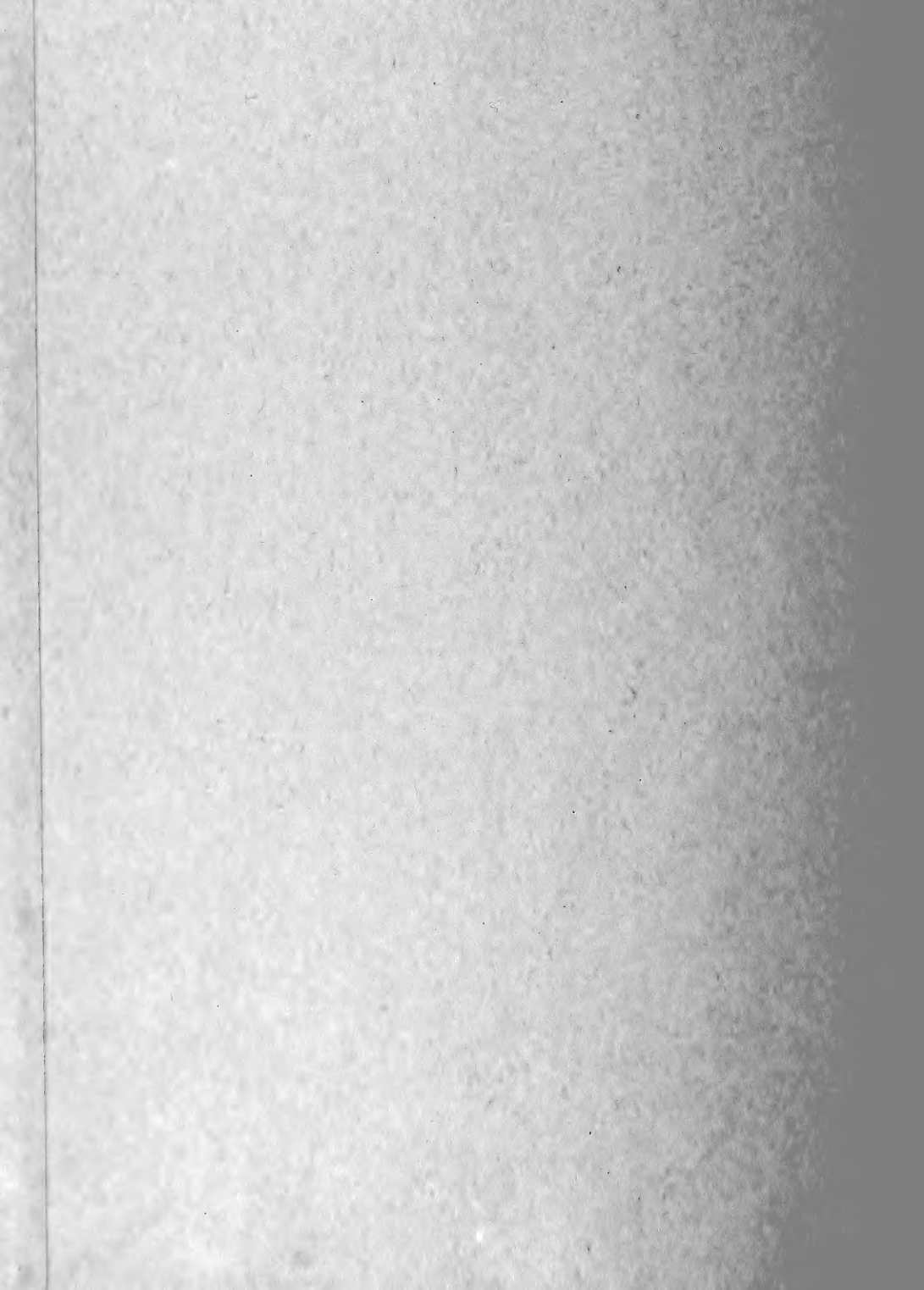
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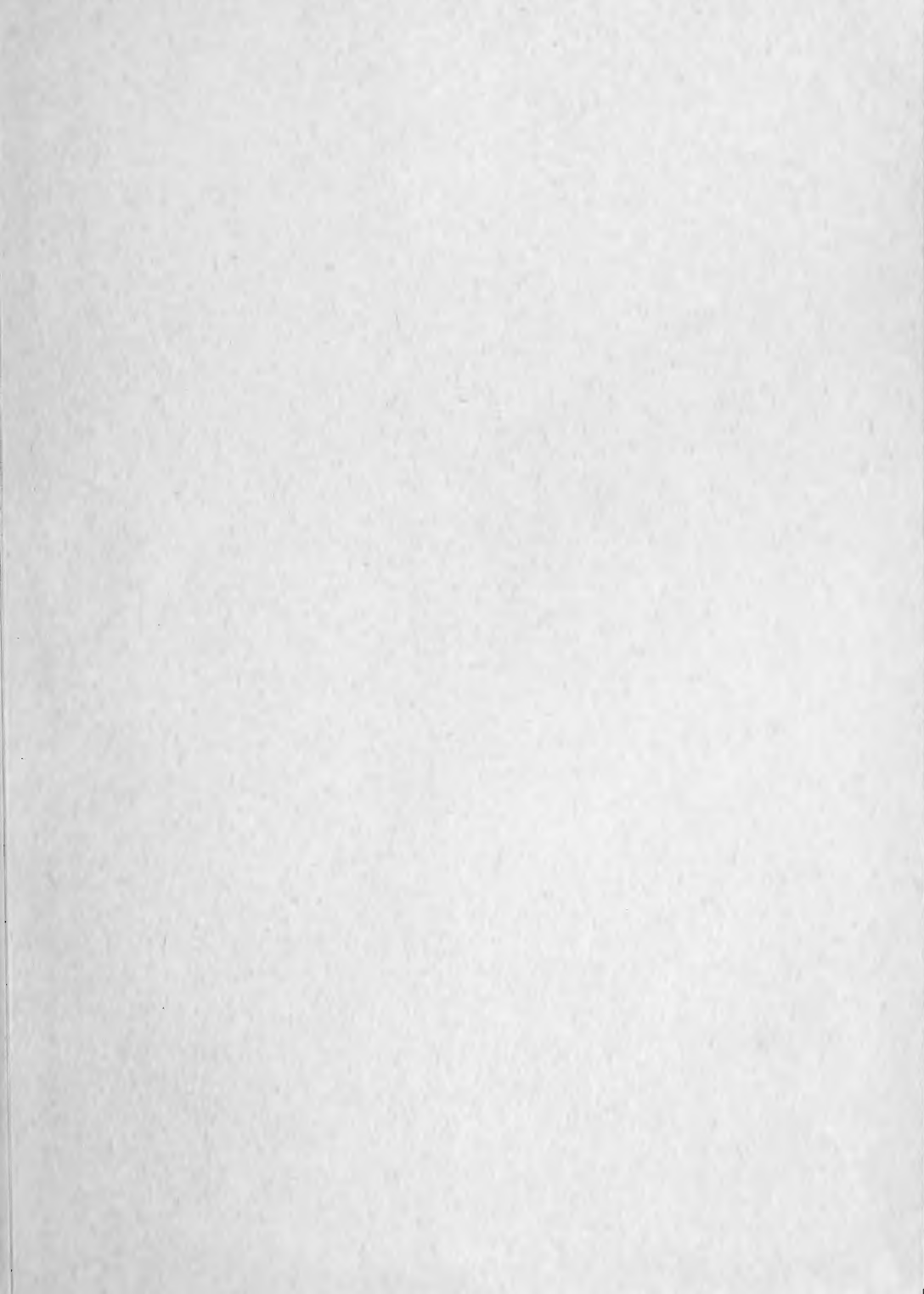
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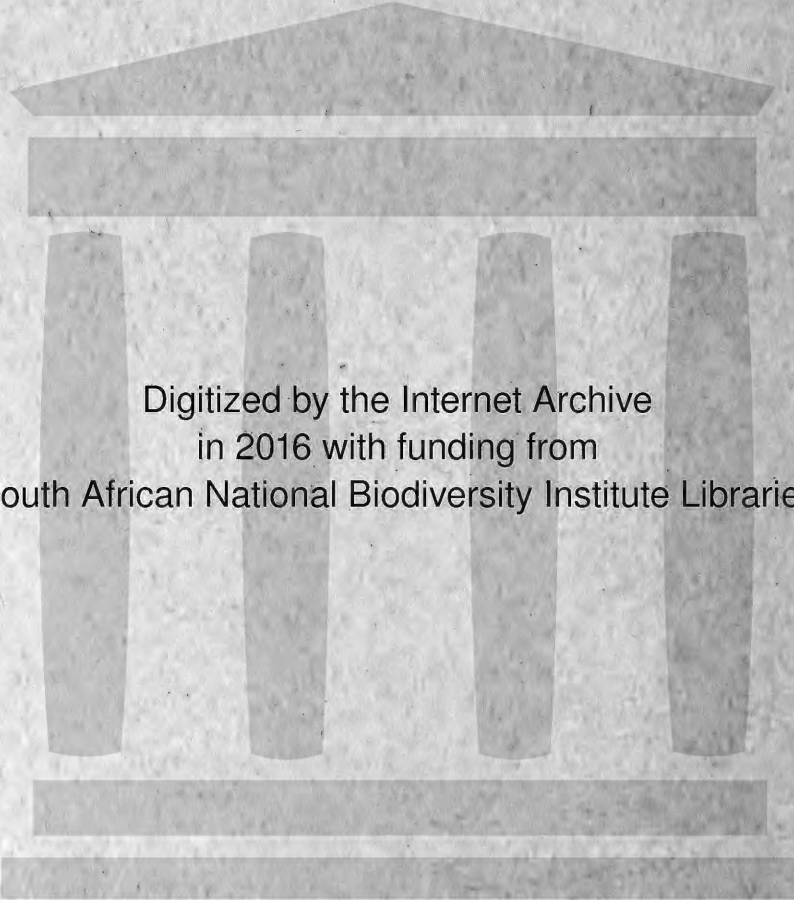


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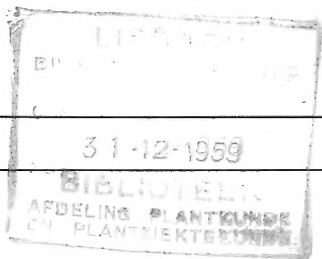


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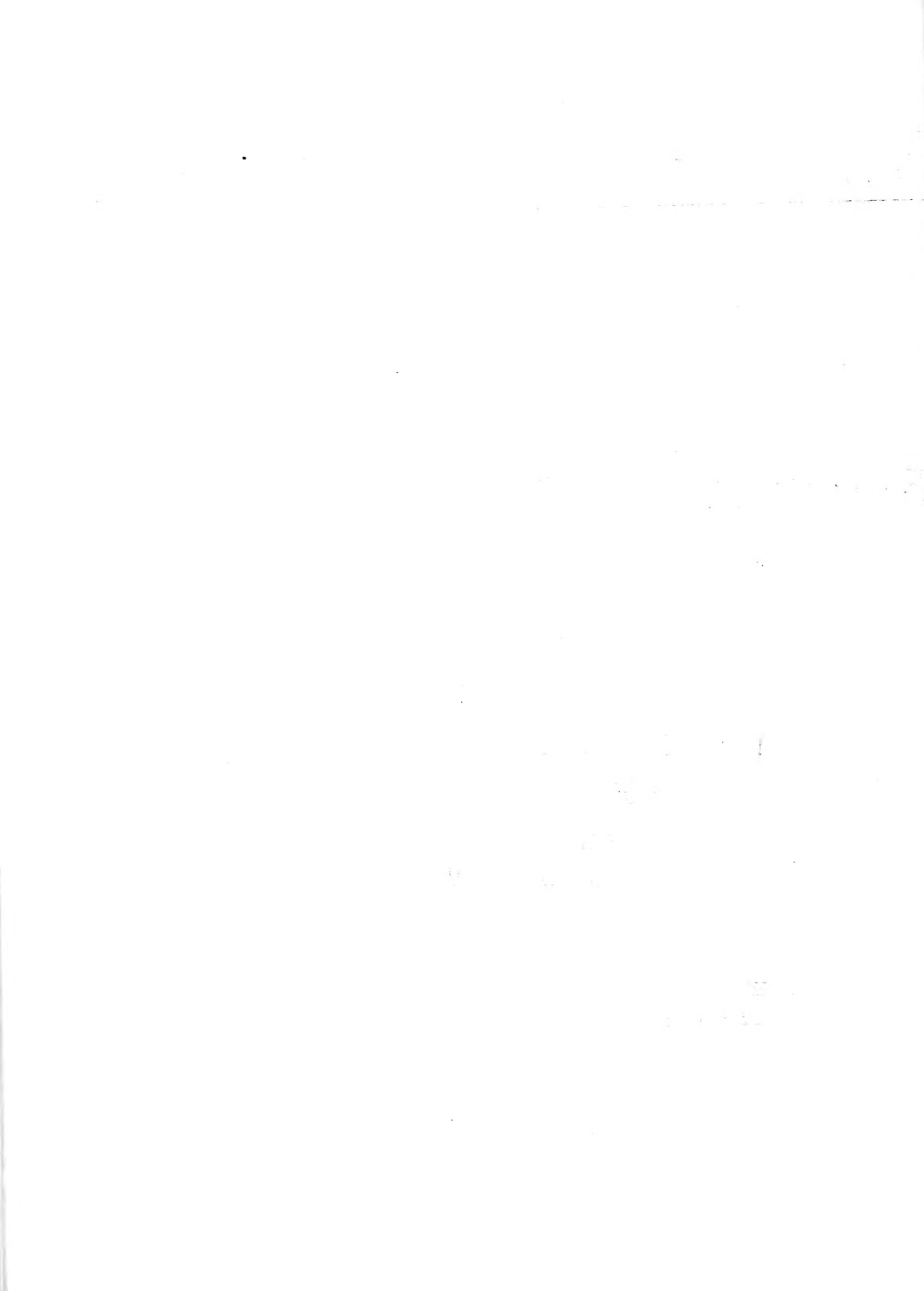
THE JOURNAL OF SOUTH AFRICAN BOTANY

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JOURNAL
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VOL. IX.

SOME NOTES ON THE GENUS LEUCADENDRON.
WITH DESCRIPTIONS OF NEW SPECIES.

By PAYMASTER-CAPTAIN T. M. SALTER, R.N. (Ret.).

In undertaking, in connection with the projected Flora of the Cape Peninsula, a rather more critical examination than has previously been made of some of the species of *Leucadendron*, it has been found that at least two of them have hitherto been misidentified and are, in fact, unnamed species. These are here described as *L. saxatile* and *L. sabulosum*, with some notes as regards their previous misidentification. *L. riparium*, sp. nov., falls into a rather different category, for it may possibly be a form of *L. glabrum* R. Br., but my reasons for describing it, together with its two varieties *collinum* and *Pillansii*, are given later in the notes under the species in question. *L. Guthrieae*, sp. nov., is only known in Caledon and Bredasdorp Divisions, but since it has previously been confused with *L. saxatile* and *L. decorum* R. Br., I take the opportunity of describing it at the same time. The descriptions and figures have all been compiled from living specimens.*

Our systematic knowledge of this large characteristic South African genus is surprisingly scant, and all herbarium workers experience great difficulty in associating their specimens with the descriptions to be found in botanical literature, many of which are incomplete and in some cases apply to one sex only. The short 3—4-line descriptions of Knight and R. Brown, the early so-called authorities on the Proteaceae, are hopelessly inadequate unless reference can be made to the *types* which they

* I have found that flowering heads preserved in alcohol have been of the utmost value for re-checking the floral characters; indeed I believe that the ideal herbarium collection in this genus ought to be supplemented by specimens so preserved. In this state, too, the inflorescences are far more easy to dissect than either in the living or "soaked out" state.

cite (*i.e.* if they are still in existence and are recognisable), nor can much more be said for those of Meisner in D. C. Prod. XIV., for they seem to concentrate on what we now know to be the characters of the least taxonomic importance. These workers were right, however, in attempting to group the species by the nature of the fruits, but in several cases they appear to have only guessed at this character and guessed wrongly.

The unsatisfactory classification, by the pubescence or otherwise of the leaves, as used in the Flora Capensis, was evidently adopted because the fruits of many of the species were not known, and though some of the species have been placed in both sections of the key, it was probably not realized that the leaves of young vigorous plants of many of the "glabrous" species, flowering for the first time, are more or less pubescent.* In that work no clear reference is made to the *types*, some of which are no longer in existence or consist of ♂ branches or old fruiting heads, and it is not possible to tell what actual plants are described. In some cases it is now known that more than one species is cited under one name, *e.g.* in *L. decorum*, *L. concolor*, *L. salignum* and, as I suspect, several others. In other words, the specimens cited cannot be trusted infallibly as belonging to the species to which they are attributed, a fact which has resulted in the greatest confusion in attempts to identify specimens with the Flora Capensis.

The incompleteness of many of the descriptions is, of course, due to the fact that the authors, as indeed they have stated, often only had material lacking all the necessary characters and were, for the purposes of the Flora, attempting to make bricks without straw. Further, they had to form their opinions from dried specimens, a procedure which, though unavoidable in many cases, is almost invariably misleading in this genus. I make these remarks with the object of pointing out to those herbarium workers who attempt to determine specimens (generally incomplete) from existing descriptions, that they are in many cases attempting the impossible. A large percentage of specimens now in herbaria are imperfect and, particularly those of unknown origin, practically worthless. The majority of collectors do not realize the necessity of obtaining complete material in this genus, with the flowering ♂ and ♀, the fruiting head and the fruits.

The genus is an extremely complex one, and many of the accepted species consist of a number of different local forms (*e.g.* *L. adscendens* R. Br.). There are, of course, a great many species still unnamed, but I do not believe that any useful purpose can be served by describing them, except from ample and complete living specimens of *precise locality*.

* The unbranched shoots of such plants often produce single ♂ inflorescences twice as large as those on old much-branched plants.

As regards the *types* of the old species, some probably cannot be recognised with certainty, but where they still exist, they cannot, I imagine, be ruthlessly dissected, without which it is sometimes impossible to make an exact comparison. Some of them only consist of inadequate figures. (See notes under *L. saxatile*). Where there is the slightest doubt and where there are not complete and unmistakeable types of known origin, or other good evidence to go upon, it would be best to disregard these old species entirely, re-describe and figure the plants fully and give them new names, as I have done, or *may* have done in the case of *L. riparium*. Such a course will have to be adopted sooner or later if we are to get away from the present deadlock. Surely there is no necessity to allow the encumbrance of past inadequate work in such genera by the old botanists, who could know practically nothing of that with which they were professing to deal, to hold up all serious study of the genus.

From the synonyms given in the Flora Capensis it would appear that many of the trivial names now in use are not admissible by the modern rules of priority in nomenclature,* but to check these synonyms would involve a great deal of travel and expense, which the results would probably not repay, besides requiring a real field knowledge of all the species concerned. In some cases different names were applied to each sex, and it seems inconceivable that Thunberg could not, in the course of his travels in South Africa, perceive that *Leucadendron* was a dioecious genus.

Apart from the nomenclature of the species, it is quite certain that the genus can never be systematically revised until some active and enthusiastic botanist is able to tour South Africa for a period of years, collect fully and observe in the field all the local variants and if possible accompany his descriptions with detailed drawings. Poring over incomplete herbarium specimens will not usefully advance our knowledge of the genus.

It must be remembered also that hybridisation is by no means uncommon.

***Leucadendron saxatile* Salter. (Proteaceae.)**

L. decoro affinis, sed ita differt:—*Frutex* ad 2·5 m. altus. *Folia* capitula cingentia ad anthesin lacticolor vel eburnea. ♂. *Capitulum* globosum vel depresso-globosum, receptaculo brevior et latior: gemmae apice interdum rubrae: bractae florales lineares, fere duplo longiores,

* As an example, our common robust shrub, the Sugar Bush (*Protea mellifera* Th.) should apparently be known as *P. repens* Linn., the "Creeping Protea"!

infra omino pilosae : squamae hypogynae 3—4-plo longiores. ♀. *Stigma* integrum, non bifidum.

A stout shrub, 1—2·5 m. high, the branchlets villosopubescent. *Leaves* obtuse or subacute, rubromucronate, rarely red-margined towards the apex, obscurely pinnate-nerved, those of the stem green, oblong, oblong-ob lanceolate or the lower narrow-obovate, glabrous or the younger rather inconspicuously lanate-ciliate, the ♀ 4—8 cm. long, 2—3·4 cm. broad, the ♂ rather smaller : floral leaves cream-coloured in the flowering season, oblong or rarely lanceolate, acute or obtuse, the ♀ 5·5—9 cm. long, 1·5—4·2 cm. broad, the ♂ proportionately smaller, usually 4—5 cm. long. *Inflorescences* solitary, the brown basal bracts cano-ciliate, otherwise glabrous, the ♀ 1·1—1·8 cm. long, the ♂ smaller, the innermost longer and narrower than the outer. *Male heads* globose or depressed-globose, 1·5—2 cm. in diam. : receptacle $1\frac{1}{2}$ — $2\frac{1}{2}$ times as long as its diam., often with a few barren bracts at the apex : floral bracts linear or slightly spatulate, obtuse, 3·5—4 mm. long, glabrous above, densely pilose with long silky white hairs beneath, ciliate towards the apex : flower bud 6—8 mm. long on opening, yellow, the younger sometimes tinged with red at the apex : perianth segments scarcely shorter than the tube, the limb 1·5—2 mm. long : anthers 1·4—1·8 mm. long : hypogynous scales yellow, 3·5 mm. long : pollen-presenter* oblanceolate in outline, 1—1·3 mm. long. *Female heads* narrow-ovoid, 3—4 cm. long, 1·5—2 cm. in diam., the receptacle oblong, tapering upwards, about 4 times as long as its diam. : floral bracts about 5 mm. long, 8 mm. broad, lightly retuse at the apex, ciliate, with a tuft of silky hairs near the middle : perianth about 8 mm. long, the segments free. *Ovary* ovoid, 1 mm. long : hypogynous scales 1·5 mm. long : style clavate, glabrous : stigma entire, on the obliquely truncate upper anterior part of the head, 0·5 mm. broad. *Fruiting head* ovoid, 4—5 cm. long, glabrous : fruit compressed, obcordate or cuneate-obcordate, blackish, emarginate, winged, 6·5—8·5 mm. long, 5·5—6 mm. broad, tubercled (Fig. 1).

Cape Province : Cape Peninsula ; Nursery Buttress, 2,500 ft., *Esterhuysen* 8002 (type in Bolus Herbarium), Nursery Gorge, 2,300 ft., *Esterhuysen* 8001, *L. Bolus* (B. Herb. 15681), *Compton* 11194 ; Wood Buttress, *Esterhuysen* 8000 (1,500 ft.), 8003 (2,000 ft.) ; Kasteel Poort, *L. Kensit* (B. Herb. 10746) ; Table Mt., *Marloth* (B. Herb. 7233), *Phillips* (S. Af. Mus. 4546), *Esterhuysen* 8215, *Pillans* 7267 ; Lion's Head, *Pillans* 8546-7 ; Kalk Bay Mt., *Levy's* 7571, *Adamson* 3387, *Salter* 312/17

* The descriptions of the so-called *stigma* in the ♂ flower given in the *Flora Capensis* refer to the specialised terminal portion of the style which holds the pollen and acts as a pollen-presenter when the flower opens. The stigma, of course, is confined to the ♀.

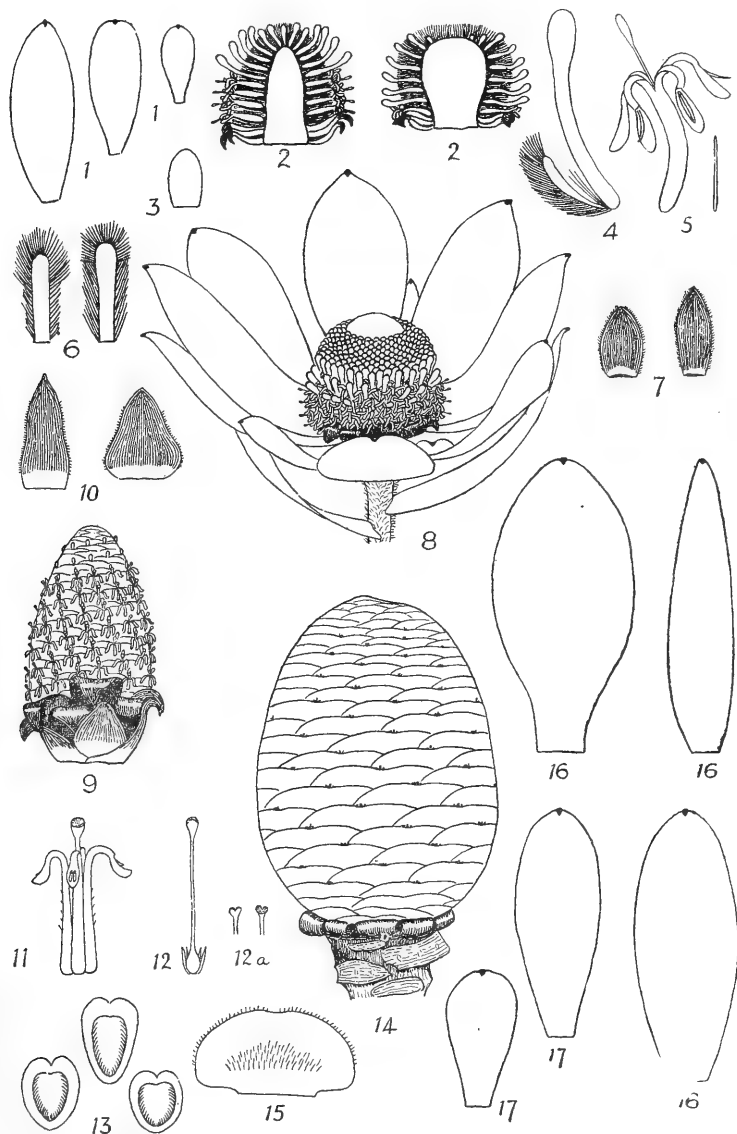


FIG. 1. *Leucadendron saxatile* Salter. Natural size, except where otherwise indicated. MALE. 1. Stem leaves $\times \frac{1}{2}$. 2. Flowering head, in section. 3. Receptacle of a small flowering head. 4. Flower bud and bract $\times 4$. 5. Perianth, pollen-presenter and hypogynous scale $\times 4$. 6. Floral bracts, upper face $\times 4$. 7. Basal bracts. 8. Inflorescence. FEMALE. 9. Flowering head. 10. Basal bracts. 11. Perianth and style, anterior view $\times 3$. 12. Style and stigma. 12a. Stigma in *L. decorum* R. $\times 3$. 13. Fruits $\times 1\frac{1}{2}$. 14. Fruiting head. 15. Floral bract $\times 3$. 16. Flowering head. 17. Stem leaves $\times \frac{1}{2}$. (Esterhuysen 8002). Del. T.M.S.

(♂ in Brit. Mus.) ; Kommetje (probably an error in locality), Galpin 4447. Fl. Aug.—Sep.

The following, not seen, are probably this species (see notes below):- Kasteel Berg, Wolley-Dod 1786 ; Table Mt., Bolus 2910.

This shrub, which usually grows in rocky places, is, as far as is yet known, confined to the mountains of the Cape Peninsula, being fairly plentiful on Table Mountain from 1,500 ft. to near the summit, but rare and very local near the tops of Constantiaberg and Kalk Bay Mt., and it has been recorded from the upper south-west slopes of Lion's Head.

It is most nearly related to *L. decorum* R. Br., but a less compact taller shrub in which the floral leaves of both sexes are cream or sometimes ivory-coloured in the flowering season. The ♂ inflorescence is globose or depressed-globose, the receptacle, though very variable in shape, being always shorter in proportion to its diam., and the flower buds are in some cases, though not always, red-tipped. The linear obtuse ♂ floral bracts are nearly twice as long and pilose on the whole of the lower surface, and the hypogynous scales 3 to 4 times as long. In the ♀ the stigma is entire, not bifid as in *L. decorum*. It is highly prone to epharmonic variation, the inflorescences and floral leaves of plants from exposed slopes high on Table Mt. being less than half the size of those from more sheltered positions.

It is probably the species which was mistaken for *L. grandiflorum* R. Br. by Bolus and Wolley-Dod (Flowering Plants and Ferns of the Cape Peninsula, in Trans. S. Af. Phil. Soc. XIV. (1903), p. 313), who may have been misled by the figure in Bot. Mag. (1814) t. 1650, *L. grandiflorum* Sims, non R. Br. (♂ only). This figure represents some species of unknown origin, which does not appear to have been hitherto identified, and it may be intended for the male of our plant. Although the leaves are much more densely ciliate, this is to be expected in a young cultivated plant probably flowering for the first time, but I cannot account for the exaggerated red margins of the leaves. This old imperfect figure, however, is of no scientific value.

Ever since the publication of the Flora Capensis, Vol. V, i (1912) *L. saxatile* has been erroneously known as *L. concolor* R. Br. The description of *L. concolor* in the Flora Capensis seems to apply to the ♂ of *L. saxatile* (described here) and to the ♀ fruiting head of Zeyher 3638, two very different species, and the specimens cited for the ♂ cannot by any means be attributed to *L. concolor*. There seems, however, to be considerable doubt as regards the true identity of that plant. The trivial name *concolor* was first applied by Knight in Knight's Proteaceae (1809) 24, under *Euryspermum concolor*, and both Knight and R. Brown, who transferred it to *Leucadendron*, cite the figures of the earlier *Protea*

globosa in Andr. Bot. Rep. t. 307 (July 1803) and Bot. Mag. (1805) t. 878, both drawn from cultivated ♂ inflorescences, probably grown from fruits collected for Lee and Kennedy by Niven near Palmiet River in Caledon Division. Unless any wild specimens of this collecting are still in existence (which is extremely doubtful), Andrews' figure in Bot. Rep. would appear to represent the *type* and if, for reasons given later, the species is worth considering at all, its trivial name should probably be *globosum*. Both figures show a species with floral leaves the same colour as those on the stem (hence the name *concolor*), a large flat-topped inflorescence (hemispherical according to Knight) and a zygomorphic perianth, a class of *Leucadendron* which never has flat winged fruits. It is utterly unlike *L. saxatile*, which has the most striking pale cream-coloured floral leaves, a globose ♂ inflorescence, an actinomorphic perianth and flat winged fruits. It seems highly probable, judging from the evidence of the two quite inadequate figures and its source of origin, viz. Palmiet River, that it is one of the many forms of the polymorphous *L. ovale* R. Br., but, like many of the early imperfectly described species of *Leucadendron*, unless adequate specimens of the type, both ♂ and ♀, can be found, it would be best relegated to "species ignotae."

Of the specimens cited in Flor. Capensis under *L. concolor*, Galpin 4447, ♂ only, Kommetje, which is in the Nat. Herb. at Pretoria, is the species here described as *L. saxatile*, but in my opinion and that of others who have studied the distribution of the Proteaceae in the Cape Peninsula, the locality given is almost certainly false, and Galpin's specimen probably came from Table Mt. Unfortunately neither *Wolley-Dod* 1786, Kasteel Berg, nor *Bolus* 2910, Table Mt., appear to be represented in any South African herbarium, but presumably they are the same as *Galpin* 4447 and, since the authors stated that they had not seen the flowering ♀, both must be males. As there is no other species on Table Mt. which could possibly answer the description and, as this plant is plentiful about Kasteel Berg, it may, I think, be assumed that both these specimens are *L. saxatile*. *Masson*, without locality, has not been seen, but it is not the *type*.

The ♀, *Zeyher*, from Van Stadens Berg (Uitenhage), of which there is a poor fruiting specimen in the South African Museum at Cape Town, might possibly be the *L. concolor* of Knight's Proteaceae and R. Brown, though apparently the only evidence to connect it with Knight's description is that the bases of the scales of the fruiting heads are tomentose. On the other hand, since modern observation has shown that nearly all species of *Leucadendron* are comparatively local in their distribution, it is improbable that it is the same as any species occurring near Palmiet River.

L. decorum, R. Br., to which I have referred as the nearest affinity of this and the following species, is understood in South Africa to be the sturdy broad-leaved early-flowering species (June—July) exemplified by the specimen *Bolus* 3737 from Wynberg Hill and common in the Cape Peninsula and Caledon Div. Meisner, in D.C. XIV, states that the *type*, in Herb. Banks, was collected by Masson "in Planitie Capensi," though R. Brown, the original author, does not mention the name of the collector. Brown cites *Protea laureola* Lam. as a synonym, but since he had no suspicion that there were several rather similar species, it would, I consider, be dangerous to assume that it is the same, without further scrutiny of the specimens and possibly dissection of the ♂ inflorescence. For this reason I have disregarded the recently made new combination *L. laureolum* (Lam.) Fourcade,* which is based upon literature. Though the description in the Flora Capensis certainly seems to apply to the ♂ of our supposed *L. decorum*, that of the ♀ is apparently taken from some other species. The floral bracts are transversely oblong, much wider than long, *not* ovate, the mature fruiting head glabrous, *not* rusty pubescent and the fruits, the largest samaras I have seen in the genus are 5—7 lines long and at least 5 lines broad, *i.e.* more than twice the size of those described. The synonym *Euryspermum grandiflorum* Salisb., cited with a question mark, is the acknowledged *type* of *L. grandiflorum* (Salisb.) R. Br. The specimen *Zeyher* 3635 partly,† Grietjes Pass (Gat ?) in Herb. Brit. Mus. is, according to Mr. S. Garside, *L. Stokoei*.

I am much indebted to Miss E. Esterhuysen and Professor R. L. Adamson for collecting the excellent fresh material from Table Mt. and Kalk Bay Mt., from which the description and figure of *L. saxatile* have been compiled.

Leucadendron Guthrieae Salter. (Proteaceae.)

L. decoro affinis, sed ita differt :- ♂. *Capitula* globosiora, minora. *Bractae* florales duplo longiores, apice acutae, infra in parte superiore glabrae, in capitulis junioribus non gemmas superiores occultantes. ♀. *Bractae* florales paene glabrae, non ciliatae, apice subacutae. *Stigma* integrum, nec emarginatum nec bilobatum.

A compact shrub, up to 2 m. high, the branchlets villosopubescent or more rarely glabrous. *Leaves* obtuse or subacute, rubro-mucronate, rarely red-margined towards the apex, those of the stem green, oblong, oblong-oblanceolate or the lower narrow-obovate, glabrous, sometimes

* Bot. Survey of S. A., Memoir 20: Check List (1940), 63.

† The other part is cited under *L. squarrosus* R. Br.

villous at the base, or in young plants, like the floral leaves, inconspicuously lanate-ciliate, the ♀ 5—10 cm. long, 1.6—2.4 cm. broad, the ♂ rather smaller: floral leaves yellow in the flowering season, oblong, the ♀ 3.5—11 cm. long, 1—3 cm. broad, the ♂ rather smaller. *Inflorescences* solitary, the brown basal bracts entirely glabrous, 6—9 mm. long in the ♀, but slightly longer in the ♂, the innermost longest. *Male heads* subglobose, the apical bracts not barren and the buds all visible: receptacle oblanceolate in outline, about 3 times as long as its diam.: floral bracts lanceolate, acute, about 4 mm. long, glabrous above, densely pilose with white silky hairs on the lower part beneath, the tips entirely glabrous: flower bud about 7 mm. long on opening: perianth yellow, the segments as long as the tube, the limb 2 mm. long: anthers 1.5 mm. long: hypogynous scales very slender, 3 mm. long: pollen-presenter oblanceolate in outline, 1.4 mm. long. *Female heads* narrowly ovoid-ellipsoid, 2—3 cm. long, 1.3—1.6 cm. in diam., the receptacle oblong, subacute, nearly 6 times as long as its diam.: bracts about 5 mm. long, 8 mm. broad, inconspicuously subacute at the apex, with a minute tuft of silky hairs near the middle, eciliate: perianth 7 mm. long, the segments free. *Ovary* ovoid, slightly compressed, about 1.6 mm. long, rather longer than the hypogynous scales: style clavate, 5.5 mm. long, the stigma entire on the obliquely truncate upper anterior face of the head, 0.5 mm. broad. *Fruiting head* ovoid, 4.5—6 cm. long, glabrous, brownish: fruit compressed, black, suborbicular, emarginate at the apex, broadly winged, about 1—1.2 cm. in diam., slightly pitted (Fig. 2).

Cape Province: Caledon Div.; Shaw's Mountain, *L. Guthrie* (Bol. Herb. 26663, type in Bolus Herbarium) 120, *Garside* 4749, 4833; Steenbras River, *Stokoe* (B.H. 17459); Kogelberg, *Stokoe* 8066, 8067; near Elgin, *Gillett* 4360; Sugarloaf, *Esterhuysen* 5086; Hermanus, *L. Guthrie* (B.H. 17459, 17591, 26664); Hangklip, *Compton* 13530: Bredasdorp Div.; Elands Kloof Mts., 5 miles S.W. of Papies Vlei, *Garside* 4695, *Salter* 4856 (at Kew and Brit. Mus. as *L. concolor*). Fl. Aug.—Sep.

This species has also been confused with *L. concolor* R. Br. owing to its superficial similarity, when dried, to *L. saxatile* Salter (q.v.), but it seems to be most closely related to *L. decorum* R. Br., from which it may be distinguished by its more globose inflorescences and the floral bracts. Those of the ♂ are about twice as long, having acute glabrous tips, which do not conceal the buds in the upper part of the young inflorescence as in *L. decorum* and *L. saxatile*. Those of the ♀ are almost glabrous and eciliate, while the stigma is entire, not bilobed or emarginate.

It gives me great pleasure to name this species in honour of Miss L. Guthrie, whose collecting, Bol. Herb. 17591 from Hermanus, is the earliest which I have been able to trace. Amongst her collection of water-colour

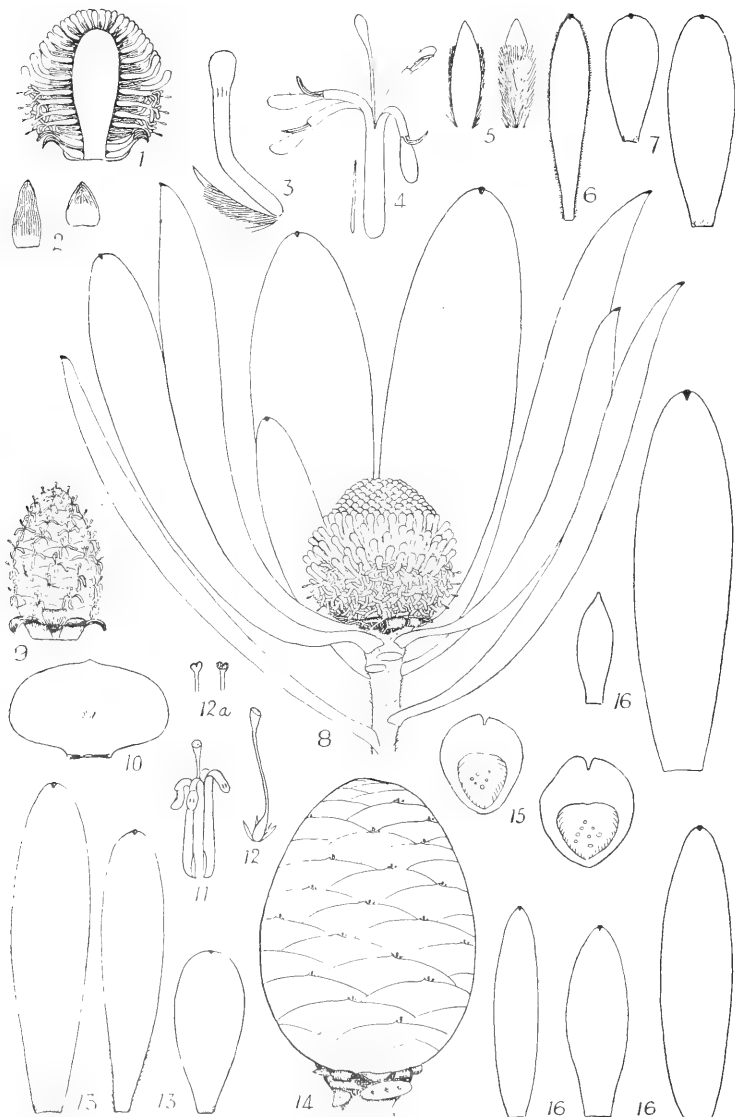


FIG. 2. *Leucadendron Guthrieae* Salter. Natural size, except where otherwise indicated. MALE. 1. Flowering head, in section. 2. Inner and outer basal bracts. 3. Flower bud and bract $\times 4$. 4. Perianth and hypogynous scale $\times 4$. 5. Floral bract, upper and lower face $\times 4$. 6. Stem leaf of a young plant $\times 4$. 7. Stem leaves of a mature plant $\times \frac{1}{2}$. 8. Inflorescence. FEMALE. 9. Flowering head. 10. Floral bract $\times 3$. 11. Perianth and style, anterior view $\times 3$. 12. Style and stigma, side view, with hypogynous scales $\times 3$. 12a. Stigma in *L. decorum* R. Br. $\times 3$. 13. Stem leaves $\times \frac{1}{2}$. 14. Fruiting head. 15. Fruits $\times 1\frac{1}{2}$. 16. Floral leaves $\times \frac{1}{2}$. (*L. Guthrie* in B.H. 26663.) Del. T.M.S.

paintings of the Proteaceae,* this plant was illustrated in 1933 as unidentified, and she has lately been good enough to send me a copious supply of living specimens from two localities, from which my description and figure have been compiled, besides furnishing me with valuable notes on some of the other species.

***Leucadendron sabulosum* Salter. (Proteaceae.)**

L. saligno affinis, sed ita differt :- *Frutex* robustior, ad 4 m. altus, in partibus omnibus major. *Folia* latiora, adulta glabra, floralia longiora exteriora ad basin semitorta. ♀. *Stigma* emarginatum, non bilobatum. ♂. *Bracteae* multae florales superiores steriles, quamobrem capitulum maturum apicem versus calvum. *Stylus* mas paulo infra apicem constrictus, apice truncatus, non bifidus.

A stout shrub, 1.5—4 m. high, the ascending branchlets erect, adpressed-pubescent. *Leaves*, when mature, glabrous, those of the stem erecto-patent, oblong-ob lanceolate, rubro-apiculate, including the uppermost half-twisted near the base and in profile position, the ♀ 3—6 cm. long, 6—9 mm. broad, the ♂ proportionately smaller, the upper turning yellow in the flowering season: floral leaves about 6, broader at the base, yellow (the ♀ paler), not half-twisted, usually 1.5—2 cm. long, often with 1—2 longer and intermediate with the stem leaves. *Inflorescences* solitary, the basal bracts brown, ciliate, 6—8 mm. long, the innermost longest. *Male heads* subglobose, or at length ovoid, 1—2.1 cm. long, dome-shaped and barren towards the apex, the receptacle oblong-lanceolate in outline, $3\frac{1}{2}$ times as long as its diam.: floral bracts convex, obovate, attenuate to the base, about 2 mm. long, glabrous above, densely tufted with long silky white hairs on the upper half of the keel and about the anterior margin beneath: flower bud 5 mm. long at opening: perianth yellow, the segments rather longer than the tube, the limb about 2 mm. long: anthers 1.5 mm. long: hypogynous scales very slender, 1.5—2 mm. long: style 4.5—5 mm. long, the pollen-presenter about 1.2 mm. long, ob lanceolate in outline, with a constriction below the truncate apex. *Female heads* ovoid-ellipsoid, 2—2.2 cm. long, 1.2 cm. in diam., the receptacle 6 times as long as its diam.: floral bracts transversely oblong, the lower about 3.5 mm. long, 9 mm. broad,

* Miss Guthrie, who has inherited her love of botany from her father, Professor F. Guthrie, who collaborated with Dr. H. Bolus in the account of the genus *Erica* in the *Flora Capensis*, has been making a special study of the South African Proteaceae from living plants since 1930, and has already made 284 exquisite accurate water-colour paintings, with line dissections, of by far the greater number of the known species in this family, including many natural hybrids. Like all botanists, she has found, for the reasons already stated, the greatest difficulty in identifying the species of *Leucadendron*. It is to be hoped that her work will eventually be published, for it will be an invaluable contribution to botany.

sometimes very slightly retuse at the apex, densely and shortly silky-pubescent except near the base: perianth 4—5 mm. long, the segments free, the posterior and anterior flat, the latter scarcely widened and retuse at the apex, shorter than the others and almost concealed by the bract, the lateral pair conduplicate with the boat-shaped limb only visible. *Ovary* flattened, about 1.1 mm. long, slightly retuse at the apex: hypogynous scales orange-yellow, shorter and broader than in the ♂: style rather longer than the perianth, broadening in the upper half with a flattened capitate head about 0.8 mm. broad, the emarginate stigma oblique on its anterior face. *Fruiting head* ovoid, truncate, about 3 cm. long, 2.5 cm. in diam., the bracts glabrous on the upper half, tomentose below: fruits blackish, widely ovate or obovate, compressed, broadly winged, deeply emarginate at the apex, 6—9 mm. long, 5—8 mm. broad, slightly pitted (Fig. 3).

Cape Province: Cape Peninsula; sandy flat on north side of east end of Slangkop Ridge, *Pillans* 9787 (type in Bolus Herbarium); Fish Hoek, *Pillans* 6785, *Page* (B. Herb. 16328); Llandudno, *Levyns* 6823; Hout Bay, *Compton* 9166, *Acock* 5844; Karbonkelberg, *Salter* 7742, *Compton* 5977; Red Hill, *Pillans* 7052, *Garabedian* (S.A. Mus. 52198—200); Smith's Farm, *Salter* 6217; Buffel's Bay, *L. Bolus* (B. Herb. 16001); Caledon Div.; Hermanus, *L. Guthrie* 111; Hangklip, *Pillans* 8211, *Compton* 13570; Bredasdorp Div.; 4 miles north of Struys Bay, *Salter* 4817 (pars foliis glabris), *Garside* 4679 (pars foliis glabris). Fl. Aug.—Sep.

L. sabulosum is a common species, occurring from the Cape Peninsula as far east as Bredasdorp Division, nearly always in sand, usually not far from the sea and often in large dominant colonies.

It is an affinity of *L. salignum* R. Br., with which it appears to have been formerly confused, but it is a much more robust species, larger in all parts, with thicker glabrous leaves and with the peculiarity (which it shares with *L. eucalyptifolium* Buek ex Meisn.), of having all, except the few short wide-based bract-like leaves surrounding the inflorescence, half-twisted at the base into profile position. It is also distinguished from *L. salignum* by the large emarginate, not bilobed stigma, by the constriction below the truncate apex of the pollen-presenter and the more pronounced dome at the top of the ♂ inflorescence, left by the numerous barren upper floral bracts, even at maturity. *L. eucalyptifolium*, an eastern woodland species, never occurring in sand, differs in having much longer more shortly apiculate leaves, ♂ flower buds square in section, hooded or incurved ♂ perianth limbs and smaller ♀ flower heads and fruits.

A close affinity to *L. sabulosum*, either a marked variety or a separate

species, occurs in several localities in Bredasdorp Div. and actually grows in association with it about 4 miles north of Struys Bay. It differs as follows:—Leaves rather shorter, more obtuse at the apex, silvery-grey

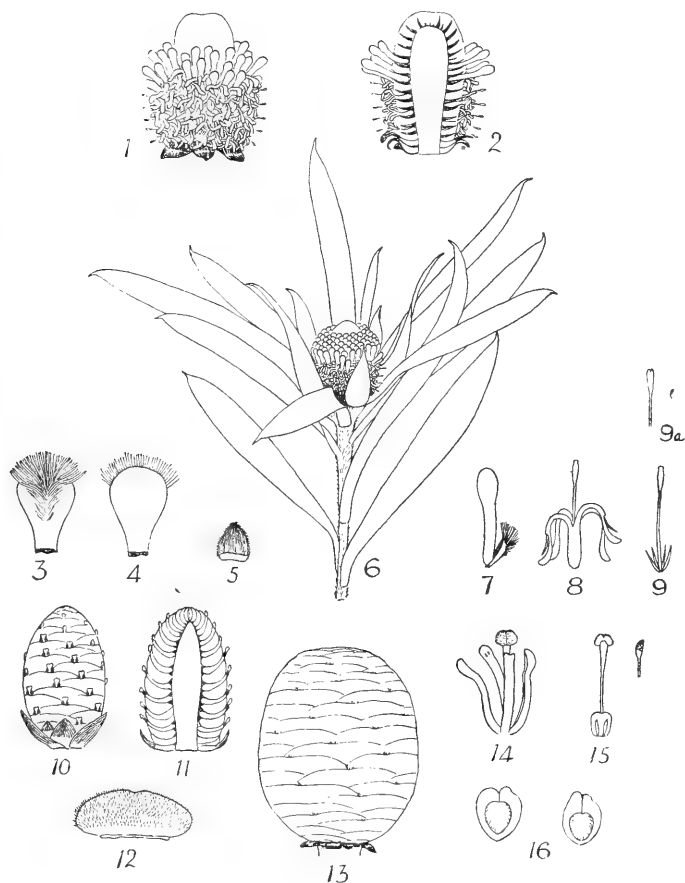


FIG. 3. *Leucadendron sabulosum* Salter. Natural size, except where otherwise indicated. MALE. 1. Flowering head $\times 1\frac{1}{2}$. 2. Ditto, in section $\times 1\frac{1}{2}$. 3. Floral bract, lower face $\times 6$. 4. Ditto, upper face $\times 6$. 5. Basal bract. 6. Inflorescence. 7. Flower bud and bract $\times 3$. 8. Perianth $\times 3$. 9. Style and pollen-presenter, with hypogynous scales $\times 3$. 9a. Pollen-presenter in *L. salignum* R. Br. $\times 3$. FEMALE. 10. Flowering head. 11. Ditto, in section. 12. Floral bract $\times 2$. 13. Fruiting head. 14. Perianth, anterior view $\times 3$. 15. Gynaecium, posterior view, with hypogynous scales and side view of stigma $\times 3$. 16. Fruits. (Pillans 9787.). Del. T.M.S.

or dull green, more or less silky-pubescent, especially in the grey-leaved form, the longer floral leaves not turning yellow in the flowering season, the shorter yellow, clasping the inflorescence closely. Male heads with very few barren bracts at the apex: bracts hairy on the whole of the lower surface: perianth and hypogynous scales smaller: pollen-presenter about 0.8 mm. long, *oblanceolate in outline, notched at the apex*. ♀. Bracts of the fruiting head tomentose on the upper half.

I have purposely refrained from naming this plant, since the above particulars have been taken partly from dried specimens and partly from information supplied to me by Miss L. Guthrie, who has made drawings of it. As already stated, I consider that the species in this genus can only be accurately described from ample living specimens. The range of variation between the dull green-leaved and grey forms also requires field observation.

Two or three plants were recently discovered by Miss L. Guthrie (Salter 8696 in Bol. Herb.) at Kogelfontein, in the south of the Cape Peninsula, which had the appearance of being hybrids with *L. uliginosum* R. Br., which was growing in association. Unfortunately the site on which they grew was cleared for farming before they could be examined in the flowering stage.

***Leucadendron riparium* Salter. (Proteaceae.)**

Frutex omnino glaber vel ramulis junioribus robustis sparse villosis folisque sparse ciliatis. *Folia* rubro-mucronata, ea ramulorum viridia, oblonga vel oblanceolata, ♀ 3—6 cm. longa, 6—8 mm. lata, ♂ paulum minora; floralia ad basin imbricata, ad anthesin eburnea vel lactea, oblonga vel plus minusve lanceolata, ♀ 3.5—7 cm. longa, 0.9—1.5 cm. lata, ♂ valde minora. *Capitulum* ♂ globosum, 1.1—1.6 cm. diam.: bractae florales 2 mm. longae, supra glabrae, infra in dimidio superiore pilosae: perianthium fere 6 mm. longum. *Capitulum* ♀ ovoideum, 1.6—2.1 cm. longum: bractae apice rotundatae, fere 9.5 mm. latae, glabrae, minute ciliatae: perianthium fere 6 mm. longum. *Ovarium* ovoideum, 1 mm. longum: stylus clavatus: stigma anteriore obliquum, 0.5 mm. latum. *Strobilus* ovalis, ad 2.7 cm. longus: samara suborbicularis, compressa, alata, fere 0.7 mm. diam.

An erect shrub, scarcely 1 m. high, the ascending branchlets glabrous or very sparsely villose in vigorous young shoots. *Leaves* acute or subobtusely, rubro-mucronate, glabrous or sparsely ciliate when young, those of the stem green, oblong or oblanceolate, the ♀ 3—6 cm. long, 6—8 mm. broad, the ♂ rather smaller: floral leaves spreading, those of the ♀ ivory-coloured in the flowering season, more or less lanceolate or oblong, 3.5—7 cm. long, 0.9—1.5 cm. broad, the ♂ pale yellow or

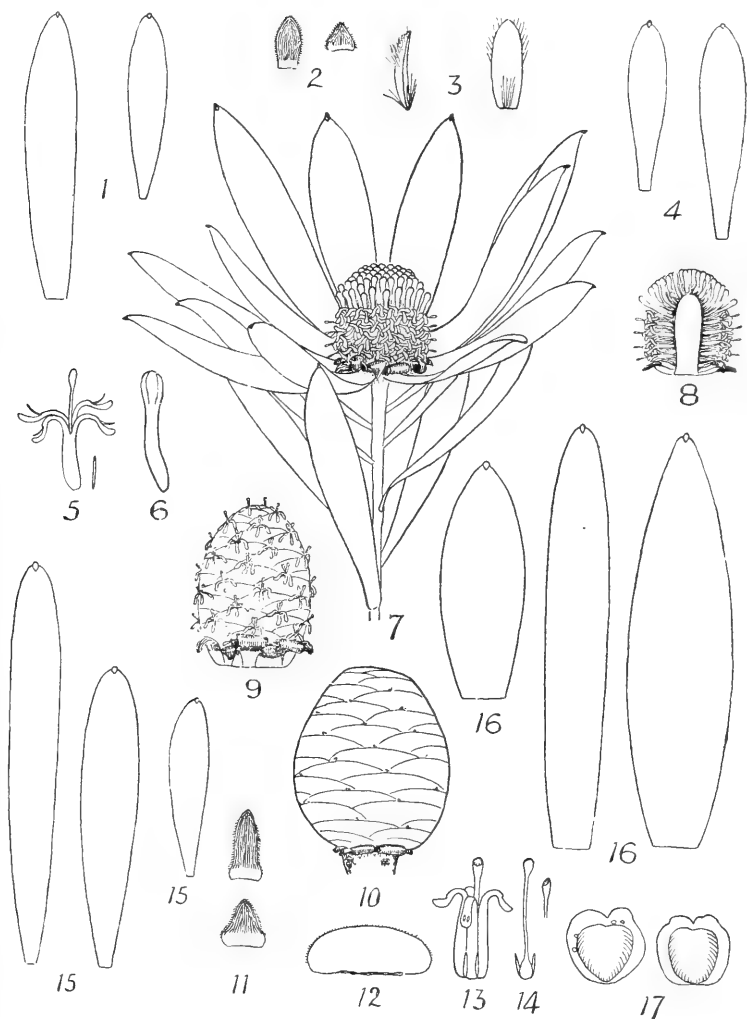


FIG. 4. *Leucadendron riparium* Salter. Natural size, except where otherwise indicated. MALE. 1. Stem leaves. 2. Basal bracts of flowering head. 3. Floral bract, side view and upper face $\times 6$. 4. Floral leaves. 5. Perianth and pollen-presenter with hypogynous scale $\times 3$. 6. Flower bud $\times 3$. 7. Inflorescence. 8. Flowering head, in section. FEMALE. 9. Flowering head $\times 1\frac{1}{2}$. 10. Fruiting head. 11. Inner and outer basal bracts. 12. Floral bract $\times 2$. 13. Perianth and style, anterior view $\times 3$. 14. Gynaecium and hypogynous scales, posterior view $\times 3$. 15. Stem leaves. 16. Floral leaves. 17. Fruits $\times 1\frac{1}{2}$. (Salter 8757.) Del. T.M.S.

cream-coloured, usually imbricating at the base, 2.5—3.3 cm. long, 6—8 mm. broad. *Inflorescences* solitary, the ♂ often numerous on short branchlets: brown basal bracts ciliate, otherwise glabrous, the innermost longest, the ♀ 7—10 mm. long, the ♂ rather smaller. *Male heads* globose, 1.1—1.6 cm. in diam., the receptacle oblong, obtuse, about $3\frac{1}{2}$ times as long as its diam., the apical bracts not barren: floral bracts oblong, subacute, about 2 mm. long, glabrous above, except for a tuft of hairs at the base, pilose with long silky white hairs on the upper half of the lower face: flower bud yellow, about 6 mm. long on opening: perianth segments about as long as the tube, the limb about 1.4 mm. long: anthers 0.8—1 mm. long: hypogynous scales 1.7 mm. long: pollen-presenter oblanceolate in outline, entire, 1.2 mm. long. *Female heads* ovoid, 1.6—2.1 cm long, 1.1—1.4 cm. in diam., the receptacle about 3 times as long as its diam.: floral bracts transversely oblong, rounded at the apex, about 3.5 mm. long, 9.5 mm. broad, glabrous, but minutely ciliate: perianth about 6 mm. long, the segments free. *Ovary* ovoid,* 1 mm. long: hypogynous scales 1.6 mm. long: style clavate: stigma entire on the obliquely truncate upper anterior part of the head, 0.5 mm. broad. *Fruiting head* ovoid, truncate at the apex, up to about 2.7 cm. long and 2.3 cm. in diam., glabrous: fruit compressed, suborbicular, winged, emarginate, black, about 0.7 mm. in diam., obscurely pitted and tubercled. (Fig. 4. *The arrangement of the floral leaves in the ♀ is very similar to that shown in Fig. 5 (i), var. Pillansii.*)

Cape Province: Cape Peninsula; on the border of a marsh on the roadside near Modderdam, west of Klaasjagers Berg, *Salter* 8757 (*type* in Bolus Herbarium); on the banks of Elsies River, near the source, N.W. of Grootkop, *Pillans* 1989, *Salter* 6263. Fl. Aug.—Sep.

Var. β *collinum* Salter. ♀ *Bracteae* florales apice obscure acutae. ♂. *Folia* floralia pauca, valde angustiora, basin versus non imbricata. *Capitula* plerumque minora, saepe depresso-globosa.

Differs from the typical form as follows: ♀. Floral bracts obscurely acute at the apex. ♂. Floral leaves fewer, much narrower, and not imbricating at the base. Flower heads usually smaller, often depressed-globose.

Cape Province: Cape Peninsula; Nursery Buttress slopes, *Esterhuysen* 185 (*type* in Herb. Nat. Bot. Gardens, Kirstenbosch); Contour Path above Kirstenbosch, *Compton* 12011; Devil's Peak, *Compton* 13407, 13408; Noordhoek Mt., *Pillans* 9789, *Walgate* (B.H. 22666): Stellenbosch Div.; *Duthie* 666, 667; Banhoek, *Martley* (B.H. 22668); Jonker's Hoek, *Pillans* 7026: Paarl Div.; Du Toit's Kloof, *Pillans* 8456; Haal Kop, *Stokoe*

* The ovary must be judged from its state in the newly opened flower, not from a partially-developed fruiting head.

(B.H. 18424): Caledon Div.; French Hoek Pass, *Pillans* 6848, *Salter* 4169; Steenbras, *Middlemost* (B.H. 22667). Fl. Aug.—Sep.

Var. γ **Pillansii** Salter. *Ovarium* compressum, subquadrangulatum, fere 0.8 mm. longum, 0.6—0.7 mm. latum, apice leviter emarginatum. *Samara* latissime cuneato-obcordata, basin versus vix alata, margine anteriore late alata, apice latissime incisa. ♀ *Bractae* florales apice obscure acutae.

Differs from the foregoing variety in having a compressed subquadrate ovary, about 0.8 mm. long, 0.6—0.7 mm. broad, slightly emarginate at the apex, and very broadly cuneate-obcordate fruits, scarcely winged towards the base, broadly winged on the upper margin, with a wide apical incision. The ♀ floral bracts are also obscurely acute at the apex (Fig. 5).

Cape Province: Cape Peninsula; marshy ground and slopes near stream at south base of Twelve Apostles, near Hout Bay Stream, *Pillans* 9786 (*type* in Bolus Herb.). Fl. Aug.—Sep.

This species is one of the many varying glabrous or almost glabrous plants with very pale cream or ivory coloured floral leaves (the ♀ much larger than the ♂), which have hitherto been placed in herbaria under *L. glabrum* R. Br. It seems to have been first discovered in the Cape Peninsula, where it is by no means common, by Mr. N. S. Pillans in 1912, and has, as yet, only been seen in a few places in the southern areas on the banks of streams and on the borders of one marsh.

The descriptions of *L. glabrum* are so scanty and conflicting that one is quite unable to apply them with certainty to any particular plant. R. Brown's original description is, of course, useless without reference to the *type* (*Wm. Roxburgh*, with the vague locality "prope Prom. B. Spei") which, according to Meisner, is or was in Herb. Banks. Meisner, in D.C. XIV, 220, also cites *Zeyher* 3642 from Klein River Mts. and his description, though longer, is still hopelessly inadequate. Of the ♀ he apparently only had the fruiting head, since he describes the ♀ capitulum as "as large as a walnut, about 1 inch in diam." If this is so, how can the species be recognised with any certainty?

In the Flora Capensis there is no reference to Roxburgh's *type*, and presumably the description applies to *Zeyher* 3642, the only specimen cited. Here the leaves are said to be 3—4 lines broad, whereas Meisner says 3—5 lines, *the floral half again or twice that width*. The specimens of *Zeyher* 3642 in the Nat. Herb. at Pretoria are superficially like *L. riparium*, except that the brown basal bracts of the ♀ inflorescence reach almost to its apex. The ovary is described, without size, as "oblong, produced at each side into a short point." I cannot check this, but if so, it is entirely different from the ovoid ovary of *L. riparium*.

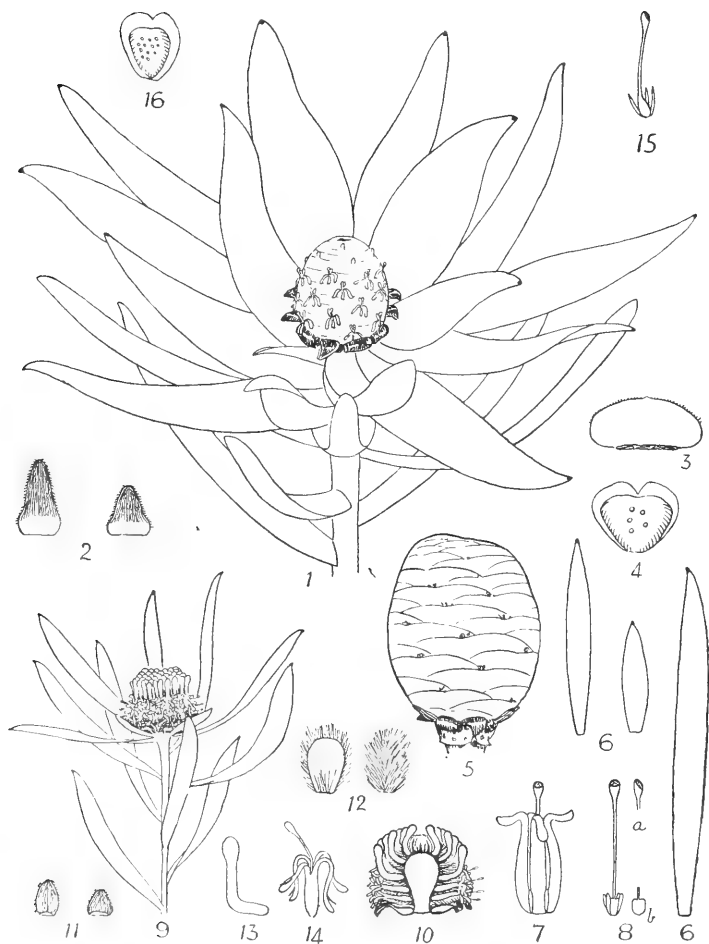


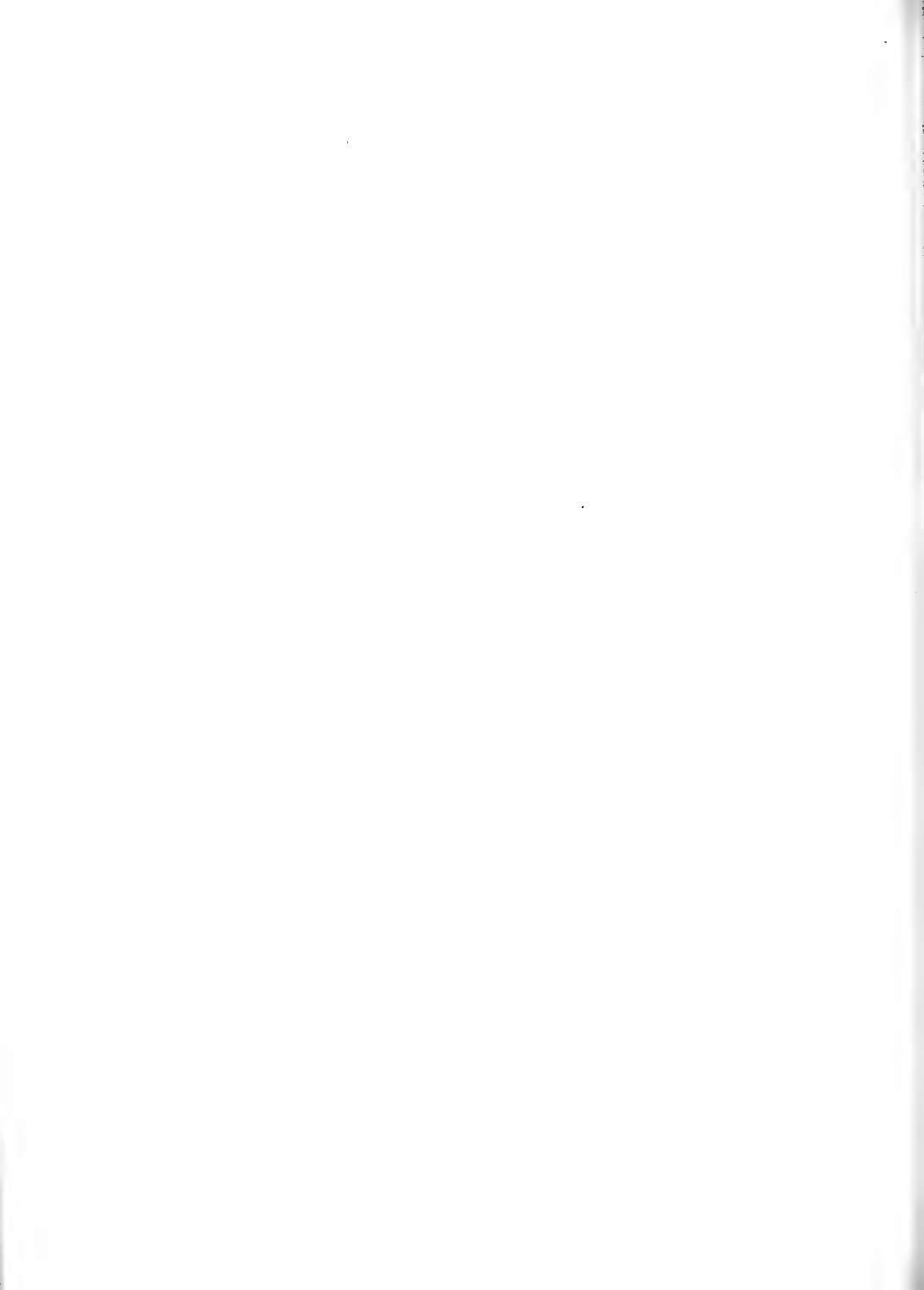
FIG. 5. *Leucadendron riparium* Salter, var. *Pillansii*. Natural size, except where otherwise indicated. FEMALE. 1. Inflorescence. 2. Inner and outer basal bracts. 3. Floral bract $\times 2$. 4. Fruit $\times 1\frac{1}{2}$. 5. Fruiting head. 6. Stem leaves. 7. Perianth and style, anterior view $\times 3$. 8. Gynaecium, anterior view, with hypogynous scales, (a) Stigma, side view, (b) Ovary $\times 3$. MALE. 9. Inflorescence. 10. Flowering head, in section $\times 1\frac{1}{2}$. 11. Inner and outer basal bracts. 12. Floral bracts, upper and lower faces $\times 6$. 13. Flower bud $\times 3$. 14. Perianth and pollen-presenter $\times 3$. (*Pillans* 9786). Var. *collinum*. 15. Gynaecium, side view, with hypogynous scales $\times 3$. 16. Fruit $\times 1\frac{1}{2}$. (*Compton* 13407.) Del. T.M.S.

Although my plant might fall under Meisner's scant description, I feel, with all this confusion, justified in describing it fully with a figure and naming it *L. riparium*. If Roxburgh's specimens are complete, and if they ever, after dissection, can be proved to be in exact agreement with my plant (mere superficial resemblance is not enough), then, at the cost of a synonym, we shall at least know what *L. glabrum* is and exactly where it can be found growing. I have only risked this synonym after long consideration: I am principally concerned in attempting to provide an intelligible account of the genus as it occurs in the Cape Peninsula.

Var. *collinum*, a hill-side form, possibly changed by habitat, only differs slightly. I have found a number of specimens of this variety in herbaria, nearly all without fruits, with the determination *L. minus* Phillips and Hutchinson, var. *glabrescens*, but I have not seen the *type* of that plant (*Burchell* 8006, Donker Hoek Mt.). *L. minus* appears to be quite a different species with densely villous branchlets, the constantly ciliate leaves being subequal in both sexes, the stigma terminal and the fruits (not described in *Flora Capensis*) smaller.

It is admittedly possible that intermediates may eventually be found between this variety and the typical form and also var. *Pillansii*.

In addition to those whose help I have already acknowledged, I am indebted to the Directors of the South African herbaria mentioned in this paper for facilities in examining specimens, to Mr. N. Pillans for living and dried material, and also to Mr. S. Garside for advice on certain technical points, and for information regarding some of the types of Proteaceae in Europe.



A REVISION OF *TRIANOPTILES* Fenzl.

By MARGARET R. LEVYNS.

In 1829 Steudel established the genus *Ecklonea* for a single species which was known to the majority of subsequent workers as *E. capensis*. Unfortunately the name *Ecklonia* had been used in 1828 by Hornemann for a common South African seaweed, and according to modern rules of nomenclature this name cannot be applied to the Cyperaceous plant. Fenzl's name *Trianoptiles* [Endl. Gen. Pl., p. 113 (1836)] must therefore be adopted.

Trianoptiles is closely related to *Carpha*, and the chief difference hitherto given lies in the perianth, which in *Trianoptiles* usually consists of three hairy scales each with three bristles at the apex, whereas the perianth of *Carpha* consists of six simple bristles. In view of the fact that in the plant described as *E. solitaria* by C. B. Clarke [Fl. Cap. VII, p. 759 (1900)] the perianth segments may occasionally be very narrow and have one bristle only at the apex, the two genera appear to approach one another very closely. Until recently the writer was inclined to follow Pfeiffer [Fedde Rep. XXIX, p. 180 (1931)] and merge the genera. However, it has now been discovered that *Trianoptiles* possesses in addition to its bisexual spikelets, female 1-flowered spikelets at the base of the plant, and it is the subterranean fruits of these female spikelets which in the past have been termed bulbils or tubers. These spikelets are described fully below. In considering generic distinctions the presence of these peculiar, partially subterranean spikelets in all three species of *Trianoptiles* is significant, as they are absent from *Carpha*. Thus it is clear that the genus should be maintained and its definition extended.

The following account of the spikelets and fruits is based on observations made on *T. capensis* Harv. A normal, bisexual spikelet after anthesis is shown in Fig. 2 C (a). The diagram (Fig. 1 A.), will make the arrangement of the parts clear. The spikelet is cymose in character, and possesses four bracts below the flowers. A flower then terminates the main axis, and growth is continued by an axillary branch which bears one bract (only visible on dissection) and a terminal flower. Each flower has three perianth scales of the type shown in Fig. 2 C (b), three stamens, and a trigonous ovary beaked at the apex (Fig. 2 C (c),) and terminated by a style which eventually divides into three branches. The structure

of the spikelet has been illustrated by C. B. Clarke, though at that time the cymose nature of the spikelets in certain members of Cyperaceae had not been recognised, and in Clarke's illustration (Illustr. Cyp. t. 77, 5) the arrangement of the dissected spikelet suggests a racemose inflorescence with a terminal, sterile bract. The female spikelet has up to the present escaped notice. The plant is tufted in habit, and the female spikelets



FIG. 1. A. Diagram of a bisexual spikelet of *Trianoptyles capensis* (in the fruiting stage).
B. Portion of a plant of *T. capensis* showing two female spikelets in fruit
2.

arise at the bases of the stems, usually below ground level. A young spikelet is shown in Fig. 2 F. Most spikelets have three bracts, though occasionally four may be present. The bases of all the bracts are thin and delicate and wrap closely round the ovary, so that the number of bracts involved is difficult to see. As a rule only two are prolonged above the ovary, and of these the lower is usually colourless (occasionally green at the tip) and wraps closely round the narrow, closed tube formed by

the uppermost bract. The length of the latter is variable, depending apparently on the depth at which the spikelet is formed below the level of the soil. The narrow, sheathing nature of this bract is shown in Fig. 2 F, where the projecting style and its three branches may also be seen. Apparently this styler sheath increases in length after pollination, as in old spikelets the tube is relatively longer, and only the tips of the style branches project. A striking feature of development in later stages is the marked intercalary growth of the lateral axis immediately below the spikelet. This is shown in Fig. 2 G, where the ripening fruit is seen carried out more or less horizontally away from the main stem. This growth ruptures the leaf sheath enveloping the spikelet, which is carried some distance from its point of origin. As a consequence of these developments the base of the style and its sheathing bracts get bent back and curve round the ovary. The majority of old fruits will be found with the curved remains of these structures still evident. Fig. 1 B shows two old spikelets in position after intercalary growth has ceased. Careful examination will always reveal the withered style branches and the slender sheathing bract of each spikelet among the leaf sheaths at the base of the plant.

T. solitaria has similar female spikelets, but here little or no intercalary growth takes place, so that the ripening fruit usually remains encased by the leaf sheaths at the base of the plant, giving a superficial resemblance to *Isoetes*. A third species which is described in this paper has female spikelets much as in *T. capensis*, but with less marked intercalary growth.

As the definition of *Trianoptiles* must be modified, and as fresh information is available with regard to the species, a short revision of the genus has been made.

TRIANOPTILES Fenzl.

Annual plants, tufted in habit. Spikelets of two kinds, those of the aerial inflorescences bisexual, those partially hidden among the basal leaves female. *Bisexual spikelets*, greenish in colour, cymose, with 3—5 more or less distichous bracts and in most cases two perfect flowers, associated with the two uppermost bracts. Perianth scales three, hairy at the base and usually terminated by three stiff bristles, occasionally the two lateral bristles wanting. Stamens three. Style with three long branches. Fruit trigonous. *Female spikelet* consisting of 2—4 tightly sheathing bracts and a terminal flower, the basal portion of the spikelet subterranean, only the narrow, tubular tip of the uppermost bract and the style branches projecting. Perianth scales absent. Fruit more or less spherical.

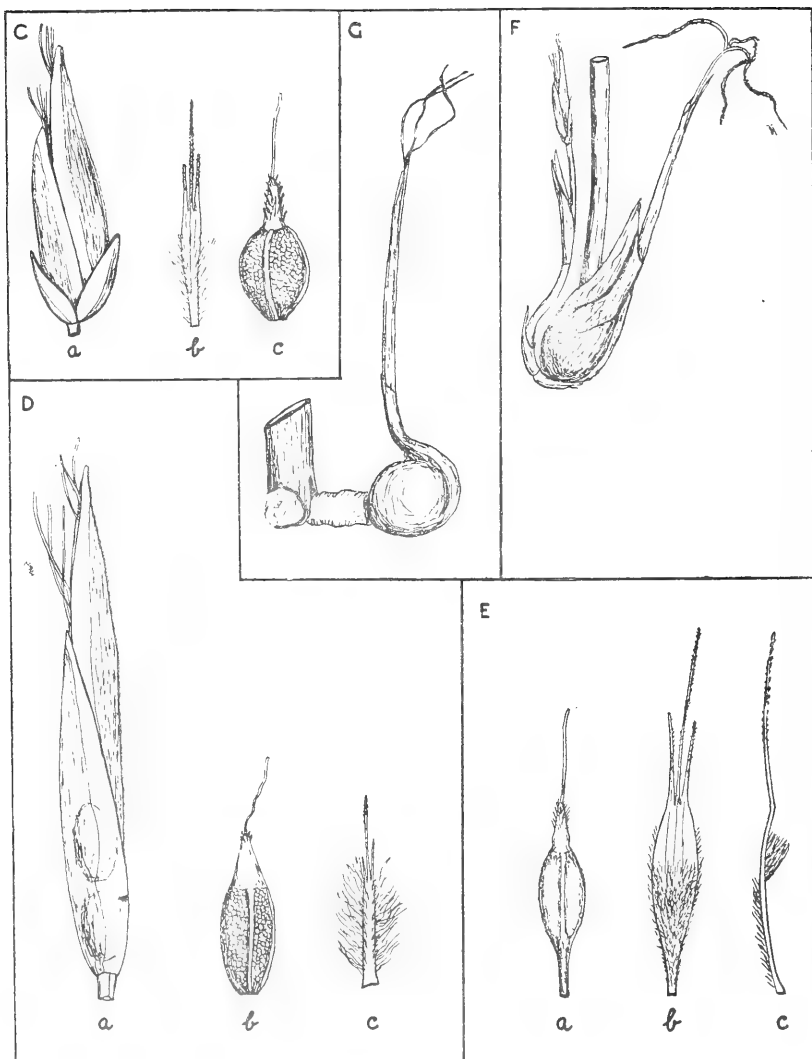


FIG. 2. *C. Trianoptiles capensis*. (a) External view of a spikelet in the fruiting stage; (b) A single perianth scale; (c) Early stage in the development of a fruit. All $\times 7.5$.

D. *T. solitaria*. (a) Spikelet bearing young fruits; (b) Young fruit; (c) Perianth scale from without. All $\times 7.5$.

E. *T. stipitata*. (a) Early stage in the development of the fruit; (b) Perianth scale as seen from the outside; (c) Perianth scale as seen in median longitudinal section. All $\times 7.5$. (Drawn from dried material.)

F. Base of *T. capensis* showing a young female spikelet and its relation to the aerial inflorescences: one of the subtending bracts removed $\times 5.5$.

G. Female spikelet of *T. capensis* in the fruiting stage, showing the axis which has arisen by intercalary growth $\times 5.5$.

Characteristic of places that are damp during the winter months.
Apparently confined to the winter rainfall area of the Cape Province.

Flowering season : August—October.

KEY TO THE SPECIES.

- A. Spikelets usually occurring in clusters; each spikelet normally with five bracts; axis not adnate to the penultimate bract.
 - B. Ovary sessile; cell outlines clearly visible on the three faces of the fruit 1. *capensis*
 - BB. Ovary stipitate; cell outlines not visible on the three faces of the fruit 2. *stipitata*
- AA. Spikelets occurring singly or in pairs; each spikelet usually with three bracts; axis adnate to the penultimate bract for the greater part of its length 3. *solitaria*

1. ***T. capensis*** (Steud.) Harv. Gen. S. Af. Pl. ed. 2, 422 (1868); Benth. in Hook. f. Ic. Pl. XIV, 34 t. 1348 (1881). *Ecklonea capensis* Steud. in Flora 138 (1829); Schrad. Anal. Fl. Cap. 34 (1832); C. B. Cl. Fl. Cap. VII, 271 (1898) and Illustr. Cyp. t. 77 4—9 (1909). *Carpha capensis* Martens ex Steud. Nomencl. ed. 2, i 300 (1840); Pfeiffer in Fedde Rep. XXIX, 180 (1931).

Plant up to 30 cm. in height, usually with many of the inflorescences projecting above the leaves. Bisexual spikelets in loose clusters, borne on branches of variable length, arising in the axils of leaves on an upright axis. Most bisexual spikelets with five bracts. Perianth scale linear or linear-oblancoelate, terminated by three bristles, the median the longest (Fig. 2 C (b)), outer surface sparsely villous at the base, the hairs principally close to the margin, glabrous a short distance below the bristles; inner surface with some hairs immediately within the glabrous area. Ovary obovoid, narrowing at the apex into a hispid beak. Fruit with well marked, smooth ribs running down the intersections of the faces, the cell outlines clearly visible on the three faces (Fig. 2 C (c)). Fruit of the female spikelet carried away from the main axis by intercalary growth.

Cape Div. Table Mountain, *Ecklon* 854 ! Stream beyond Camps Bay, *Wolley-Dod* 3129 ! Above Camps Bay, *Levyns* 7572 ! Newlands, *Levyns* 5150 ! Kenilworth, *Bolus* 7243 ! Hout Bay, *Levyns* 5201 ! Simonstown, *Levyns* 4747 ! Bonteberg, *Levyns* 5922 !

2. ***T. stipitata*** Levyns sp. nov.

T. capense valde affinis sed squamis perianthii majoribus, basitomentosis, et ovario stipitato angustiore faciebus levibus differt.

Plant up to 20 cm. in height, very similar to *T. capensis* in general habit. Distinguished from that species by (i) its perianth scales, which

are relatively larger, oblanceolate, much more densely and shortly hairy outside, and with a dense tuft of hairs on the inner surface a little below the bristles (Fig. 2 E (b), (c)), and (ii) its stipitate ovary, which is more slender, more acutely trigonous, and has smooth faces on which no cell outlines are clearly visible (Fig. 2 E (a)).

Cape Div. Maitland, *Wolley-Dod* 3244 ! Athlone, *Giffen* (*Levyms* 6017) (type in the Bolus Herbarium) ; Brackenfel, *Acock* (51068 in the Herbarium of the South African Museum) ! Stellenbosch Div. Hottentots Holland, *Pappe* (24259 in the Herbarium of the South African Museum).

3. *T. solitaria* *Levyms* nov. comb. *Ecklonea solitaria* C. B. Cl. in Fl. Cap. VII. 759 (1900) ; Kew Bull. Addit. Ser. VIII. 43 (1908). *Carpha solitaria* Pfeiffer Fedde. Rep. XXIX. 180 (1931).

Plant up to 20 cm. in height, many of the inflorescences short and somewhat hidden among the leaves, never projecting far beyond them. *Bisexual spikelets* arising singly (or occasionally in pairs) at rather distant points on a somewhat flattened axis. Spikelet long and narrow (Fig. 2 D (a)) with three bracts, the positions of the fruits clearly visible from without. Axis above the first flower adnate to the second bract for most of its length, the free part curved so that the second flower is superimposed on the first. Perianth scales hardly longer than the ovary, linear, densely villous, the two lateral bristles frequently absent or much reduced in size (Fig. 2.D (c)). Ovary slightly trigonous, passing gradually into an almost glabrous beak. Cell outlines clearly visible on the three faces of the fruit (Fig. 2 D (b)). Female spikelet with a very long sheathing bract round the style ; lacking the intercalary growth seen in *T. capensis*, consequently the fruits ripen in the axils of the leaves close to the stems.

Cape Div. Between Raapenberg Vlei and the Camp Ground, *Wolley-Dod* 3348 ! Kenilworth, *Levyms* 5892 ! Rondebosch Common, *Levyms* 7573 ; Brackenfel, *Acock* (51067 in the Herbarium of the South African Museum) !

ACKNOWLEDGMENTS.

I wish to express my thanks to the Curators of the following herbaria for granting me the privilege of examining their collections : Bolus Herbarium, University of Cape Town ; National Herbarium, Pretoria ; South African Museum Herbarium, Cape Town. I also wish to acknowledge the assistance of a grant made by the National Research Council and Board in connection with this research.

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SKETCH MAP OF BURCHELL'S TREK.

Compiled by HELEN M. MCKAY.

INTRODUCTION.

This sketch map, showing Burchell's wanderings in South Africa, 1810—1815, is offered as a modernised version of his map which was published in 1822.

In its compilation, the material used has been derived from that set down in nine of his field sheets (42 cm. x 53 cm.) which are now in the Hope Department of Zoology (Entomology), University Museum, Oxford, and from the physical features of South Africa given in the *Topographical Map compiled in the Office of the Director of Irrigation*, Pretoria, 1937.

As a traveller, Burchell broke new ground in South Africa. He belonged to a period prior to that in which the botanists had become so specialised that they looked askance at anyone who digressed into other branches of science. His energetic curiosity into every branch of natural history convinced him that a botanist as well as a traveller was incomplete if he were not a bit of a geographer and map-maker.

As this production is intended chiefly for the use of botanists, no details as to his method of map-making will be discussed here.

No claim is made to the interpretation of his sheets being more than an effort to provide the botanist with a stepping stone between Burchell's published map and that which may be drawn up when he is working in any of the divisions of the Union through which Burchell passed.

It will also assist the systematist, who has not access to Burchell's manuscript Diaries, to fix the localities for Burchell plants which are often quoted (e.g. in Fl. Cap.) by number alone. Further, a knowledge of Burchell's type localities will be of value in assisting in the re-discovery of the plants and in confirming the identifications of specimens collected subsequently.

Let Burchell's own words speak on my behalf:

"There is, it must be acknowledged, some presumption in thus pronouncing the nature of a country never yet visited by any traveller; but as we are living in the age for hypothesis in geography, the presumption will appear the less remarkable: nor indeed do I much care whether this hypothesis be here proved or disproved, if it do

but excite the curiosity of some properly qualified traveller to explore the region," (*Travels*, Vol. I, p. 443.) and, I may add, supply a detailed map of it.

ACKNOWLEDGMENTS.

My thanks are extended to all who have helped with advice and encouragement, but particularly are they given to :

The Principal and the Librarian, respectively, of the University of the Witwatersrand for permission to use the photostats of Burchell's field sheets, and the sheets of the topographical maps of the Union.

Professor Wellington, Department of Geography, University of the Witwatersrand, for permission to use mapping tables and instruments.

Mr. J. Ross, late Librarian of Kimberley Public Library, for the loan of Horne's map of the Colony of the Cape of Good Hope.

Dr. S. J. Botha, of Seodin, Kuruman.

Miss H. J. Smith and Mr. J. D. G. Fouche, of Hopetown.

Mr. S. H. Rubidge, of Graaff-Reinet.

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Miss M. Gentles, who willingly gave her time and talent as draughtsman, and Miss Hammar for her assistance.

The Chief Archivist for the Union for the use of Baird's 1796 Map of the Cape Peninsula, and Miss L. R. van Niekerk of Kirstenbosch for adapting it.

Without Professor Compton's kindly criticism and guidance, this presentation of Burchell's trek would not have appeared, and to him as Editor of the JOURNAL OF SOUTH AFRICAN BOTANY I give my thanks for all his help.

THE CHARTS OR SHEETS.

These have been arranged on similar lines to Burchell's. No. 7, in the original, is missing ; but the published map gives the details sufficiently clearly to work on. For convenience, this northern section has been divided into 7A and 7B, allowing a good overlap for working purposes. Space and paper have, thus, been saved, as has been in the case of section 9. Burchell put the section from Graaff-Reinet to Commadagga on what is here published as two parts, Nos. 5 and 6. It was considered advisable to present No. 9 in two parts rather than overcrowd Nos. 5 and 6.*

* Sheet A is based on portion of a map (Cape Archives M.88) prepared for Sir David Baird in 1796. The localities are indicated by capital letters and numerals, the index to which is written in the margin. The following is the index, which is reproduced here on account of its intrinsic interest.

- | | |
|--------------------------------------|-----------------------------------|
| A. The Citadel. | F. Lion's Rump .. 1143 Feet high. |
| B. The Town. | G. Craig's Tower and Battery. |
| C. Table Mountain .. 3582 Feet high. | H. Fort de Knokke. |
| D. Devil's Hill .. 3315 Feet high. | I. Wharf. |
| E. Lion's Head .. 2160 Feet high. | K. Rogge Bay Battery. |

The numbering of Burchell's stations will show his movements in chronological order, and this same order has been adhered to in the accompanying lists of his herbarium numbers.

It will be found necessary to read these charts accompanied by a physical map; to have inserted more names or details and covered all the ground Burchell did, would have necessitated maps on a much larger scale and more of them.

THE TEXT.

The text accompanying the charts is arranged chronologically. Burchell's names for his stopping places have been used; but, wherever possible, there is, within brackets, a modern equivalent for them. The names of the localities are those given in his *Catalogus Geographicus*, and most of them appear in his published map. Under the heading of "remarks," notes have been made of items to which Burchell called special attention, either by making sketches of them or writing up full notes about them in his *Ephemeris*. By so doing, it would appear that he had every intention of including them in the botanical work he had hoped to publish.

Reference should be made to McKay, "William John Burchell, Botanist," *Journ. S.Af. Bot.*, Vol. VII, 1941.

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- | | |
|------------------------------------------------|------------------------------------------------------|
| L. Amsterdam Battery. | 16. Place de Bergh. |
| M. Chavonnes Battery. | 17. Place de Holtman. |
| N. Battery de Mouille. | 18. Place de Heuning. |
| O. Little Battery. | 19. Place de Kersten. |
| P. Society House. | 20. Place de langerjan. |
| Q. Camps Bay. | 21. Stellenburg. |
| R. Company's Grange. | 22. Rust en werk. |
| S. Eeklenburg. | 23. Vredenhoff. |
| T. Rondebosch. | 24. Place de dollfuss. |
| U. Brandeburg. | 25. Wynberg. |
| V. Welgeleegen. | 26. House of de Waal. |
| W. Place de Jouberte. | 27. Clasenbosch. |
| X. Place named Bellevliet. | 28. Goedgeloof. |
| Y. La view de Mer. | 29. Witteboomen. |
| Z. Roodebloem. | 30. Place de Franken. |
| 1. The old Corn Mill. | 31. Great Constantia. |
| 2. Salt River. | 32. Little Constantia. |
| 3. Zonnebloem. | 33. Place de Brink. |
| 4. Horse Island. | 34. Place called Bergvlied. |
| 5. Salt River. | 35. The Camp. |
| 6. River de Liesbeek. | 36. Deep River. |
| 7. De oude mond. | 37. van Elsting's House. |
| 8. Great road from the Cape to
Simon's Bay. | 38. Lokkenaar's House. |
| 9. Gordon's Battery. | 39. Rossouw's House. |
| 10. Cohoorn's Battery. | 40. Shallow lake nearly dry in the
summer season. |
| 11. Sea line. | 41. Newlands. |
| 12. Muniek lines. | 42. van Rheen's House. |
| 13. Place dryer. | 43. Paradise. |
| 14. Place de Kemper. | 44. Kerstenbosch. |
| 15. Place de Herholdt. | |

Sheet A.—CAPE TOWN AND CAPE PENINSULA IN 1810—11.

Map Ref.	Place.	Date.	Herb. Nos.	Remarks.
(a)	From Strand Street via Kloof round Lion's Head.	29. 11. 1810	—	Gives list of plants observed, <i>Travels</i> , Vol. I, p. 15.
(b)	On the plain between Cape Town and Table Mt.	5. 12. 1810	1—105	<i>Tr.</i> , I, 19.
(c)	From Leeuwen Straat to Lion's Rump —on East side.	6. 12. 1810 7. 12. 1810 11. 12. 1810	106—148	<i>Tr.</i> , I, 20.
(d)	On Sand Flats east from Rondebosch	14. 12. 1810	149—225	<i>Tr.</i> , I, 57.
(e)	About the Blockhouse, in the Kloof, between Lion's Head and Table Mt.	21. 12. 1810	226—290	<i>Tr.</i> , I, 31.
	On the Southern point, Lion's tail, of the Lion Mt.		291—294	
(f)	To Camps Bay via Green Point. Returned to C.T. via Kloof.	27. 12. 1810	295—403	<i>Tr.</i> , I, 29.
(g)	To Paradys via Newlands . . .	3. 1. 1811	494—506/2	<i>Tr.</i> , I, 37.
(h)	About Salt River, near the Windmills	14. 1. 1811	507—516	
(i)	Ascent and on top of Table Mt. . .	24. 1. 1811	517—664	<i>Tr.</i> , I, 42—6, 1c, 275.
(j)	About the Ponds and at Salt River	31. 1. 1811	635—694	<i>Tr.</i> , I, 51, 53, 56.
S.E. of (k)	On the Flats, a little beyond the Windmills and to S.E.	31. 1. 1811	695—708	
See (d)	On the open Flats of Rondebosch.	31. 1. 1811	709—715	
	East of Rondebosch . . .		716—731	
(l)	On the Flat near Munnick Bridge, on Camp grounds.	31. 1. 1811	732—741	
(m)	Govt. Botanic Gardens . . .	1 & 2. 1. 1811	742—755	<i>Tr.</i> , I, 24. Suggests growing indigenous plants in the Gardens.
(n)	To Constantia via Rondebosch and South side of Wynberg Camp, re-turning below the Camp via the flats, N. side of Rondebosch.	14. 2. 1811 14. 2. 1811	756—834 820—832	<i>Tr.</i> , I, 59. Herb. Nos. 741—755 were collected from gardens in Cape Town. C.G. 833. <i>Calodendron Capensis</i> , Ic.
(o)	Under Lion's Head next the sea by Dr. Liesching's.	18. 2. 1811	835—837	
(b)	Between Cape Town and Table Mt.	18. 2. 1811	838—840	C.G. 858 is <i>Disa grandiflora</i> , Ic.
(f)	At Camps Bay . . .	6. 3. 1811	841—857	Ic. 285 shows <i>Agave Americana</i> .
(p)	At Wynberg walking towards Kers-tenbosch.	14. 3. 1811	859—888	is from Hesse's garden. C.G. 889

WESTERN PROVINCE IN 1811.

Sheet 1.—From Cape Town to Zwartberg, Genadendal, Brandt Valley, Paarl and Stellenbosch.

Map Ref.	Place.	Date.	Herb. Nos.	Remarks.
(b)	Between C.T. and Table Mt.	16. 3. 1811	890—892	
(h)	At Camps Bay	27. 3. 1811	893—895	
(b)	Between C.T. and Salt River	4. 1811	896—899	
(b)	Between C.T. and Table Mt.	6. 4. 1811	900—926	
WESTERN PROVINCE IN 1811.				
(i)	In Hottentot Hollands Pass	9. 4. 1811	941	
(ii)	At Bot River	10. 4. 1811	928—30, 933, 937 940, 943—46	Tr., I, 88, Tr., Vol. I, 93.
(iii)	At Boontjies Kraal	10. 4. 1811	934—935	
(iv)	Zwartberg Hotbaths [Caledon]	10. 4. 1811	927, 931—932, 936	Tr., I, 95.
(v)	Genadendal (just above burial ground) and vale of Zondereinde.	11—13. 4. 1811	942, 8614—8643	Tr., I, 103—15.
(v—vi)	Between Groote Kop at Genadendal and Brandt Valley [near Worcester]	14. 4. 1811	937	
(vi)	At Brandt Valley	14. 4. 1811	8642—8643	
(vi—vii)	From Brandt Valley to Tulbagh	15. 4. 1811	946—948	
(vii)	On Witsenberg near Tulbagh mostly on ridge northward from road over mountains to Bokkeveld.	17. 4. 1811	8644—8732	" 8722—8732 were in the Witsenberg bundle, but tied up in a separate parcel. They are most probably natives of Witsenberg." Cat. Geog.
(viii)	At Paarl: back of v.d. Byl's house near Paarl.	20. 4. 1811	949, 961, 950—960	Rainy season.
(ix)	In the sandflats under Stellenbosch Kloof.	21. 4. 1811	962—964	In Burchell's <i>Catalogus Geographicus</i> after No. 964 is the following note: "At this part of the catalogue should have been inserted those plants which will be found from No. 8614 to 8732." They have been entered at their proper location in this table.

THE LONG TREK. 1811—15.

Sheet 1.—From Cape Town to Karoo Poort; Divisions of Cape, Paarl, Wellington, Tulbagh, Worcester and Ceres.

Map Ref.	Place.	Date.	Herb. Nos.	Remarks.
1—2	Sand Flats, between Zand Vallei and Tygerberg.	20. 6. 1811	965—967	Tr., I, 173.
2 3	About Pampoen Kraal, near Tygerberg. [Durbanville.]	21. 6. 1811	968—973	Tr., I, 174.
3—4	From Pampoenkraal to Rhinoceros bushes.	21. 6. 1811	974—987	
4—5	Rhinoceros bushes [near Paarl] to Olyvenhout bosch. [Olive tree bush.]	22. 6. 1811		Tr., I, 176—77. Broken pole because of sand; no collection.
6	Marais' vineyard on Berg River ..	23. 6. 1811		Tr., I, 179.
6—7	Between Great Berg River and Piet v.d. Merve.	24. 6. 1811	982	River taken recently a new course; travelled late afternoon and by moonlight.
7—8	Piet v.d. Merve and Rooetzand Kloof. [E. of Hermon] (western end).	25. 6. 1811	983—987	
8	In Rooetzand Kloof ..	26. 6. 1811	988—1023	
8 (a)	At the Village of Tulbagh. ..	27. 6. 1811	1024—1025	
8 (b)	In a walk from Kerkstraat, Tulbagh to the Drostdy.	1. 7. 1811	1026—1045	Tr., I, 186.
9	Breede River [a few miles from source] at De Liefde. [Hugo's.]	4. 7. 1811	1046—1058	Travelled 47 miles with relays of oxen during a moonlight night.
9—10	De Liefde and Hex River Kloof ..	4. 7. 1811	1059—1083	Noted <i>Lycium</i> ten feet high.
11	Buffels Kraal—De Straat ..	5. 7. 1811	1084—1115	
11—12	De Straat, Verkeerde Vlei to Bok Rivier Farm.	6—12. 7. 1811		Specimens 1046—1197 were all lost.
12	In a walk from Farm to Mis. ..	9. 7. 1811	1116—1160	Tr., I, 203, 250.
12—13	Between Farm and Karoo Poort. ..	13. 7. 1811	1161—1164	<i>Ericaceae</i> and <i>Diosmeae</i> as well as plants of <i>Pro-</i>
13	At western entrance of Karoo Poort	17. 7. 1811	1165—1203	teaceous and <i>Restiaceae</i> tribes were not met with after this until he re-entered the same botanical parallel at Commadagga, E. Province. Tr., I, 208—9.

Map Ref.	Place.	Date.	Herb. Nos.	Remarks.
27-28	Kuilenberg (Pit Mt.)	8. 8. 1811	1330-1344/4	C.G. 1331. <i>Othonna trifida</i> Th.; the <i>Harpaxis losch.</i> or resin bush of the Hottentots. C.G. 1340. <i>Mes. campestris</i> . Ic. 324/2.
28-29	Via Poort Egaal to Riet Rivier [between Rooipoort Mt. and Bonteberg].	9. 8. 1811	1345-1364	"Poort Egaal (the Equal Pass) bears that name on account most probably of the road continuing through it, on the same level with the land on either side." <i>Tr.</i> , Vol. I. 261. Ic. 325. Near here, a branch of the Riet R. is now named Portugal R. Note: "A kind of <i>Fescue</i> -grass, a rare and solitary exception." <i>Tr.</i> , I. 260.
29	Riet River	10. 8. 1811	1365-1385	C.G. 1360. <i>Lycium</i> . Prominent shrub, standing 4-5 ft. He took seeds; cultivated them in Fulham. Ic. 24. 9. 1821.
29-30	Riet River Kloof	11. 8. 1811	1386, 1387	C.G. 1344/3, 1344/4. <i>Lichens</i> . Hooker
30	Between Riet River and Stink Fontein.	14. 8. 1811	1388-1394	<i>Muscis Exaltatis</i> .
30-31	At Stink Fontein	14. 8. 1811	1395-1398	Riet or Reed. C.G. 1346. <i>Scirpus spathaceus</i> found here. <i>Tr.</i> , I. 263.
31	Seldery Fontein (P.O. Celeryfontein)	15. 8. 1811	1399-1402/3	
32	Kanna Kraal [Ganna Kraal near Beukesplaats P.O.].	16. 8. 1811		C.G. 1402/2. <i>Crassula columnaris</i> Ic. 328. C.G. 1402/3. <i>Crassula pyramidalis</i> Ic. 327.
33	Karree River	17-24. 8. 1811		C.G. 1406. <i>Nasola aphylla</i> found here; native name "Ganna".
34	A nameless river (Riffle R. [?]) [Droë Rivier]	25. 8. 1811		From Karree R. he left the usual track to Zak R. and travelled more easterly through Nieuwveld rising from 800 to 1,000 ft.
33-35	Gaortner's [near Klip Houvel] Lat 32°	26. 8. 1811	1403 1425	At this place Burchell had an accident with his gun, hence his improvised name of Riffle R.
35	At Gaortner's	27. 8. 1811	1426-1431	C.G. 1402/4 <i>Mesem. magnipunctatum</i> . Ic. 330. C.G. 1422/2 <i>Eup. mauritanica</i> in saxosis at Riffle R. Ic. 331. C.G. 1425/2 <i>Aloe claviflora</i> in saxosis at Riffle R. Ic. 332. C.G. 1430 <i>Hesperantha longituba</i> met for first time; a remarkable species.

Sheet 3.—From Klip Heuvel (S.E. of Fraserburg) to Groot Modder Gat. Divisions of Fraserburg, Carnarvon, Prieska.

Map Ref.	Place.	Date.	Herb. Nos.	Remarks.
36	Kleine Kwagga Fonteyn (Quagga Fontein).	27. 8. 1811		
36—37	Dwaal Rivier.	28. 8. 1811	1432—1460	At fork of roads (secondary) to Williston and Carnarvon.
37	At Dwaal Rivier	29. 8. 1811	1461—1481	C.G. 1481 <i>Hibiscus cucurbitinus</i> found for the first time: "a remarkable species." Tr., I, 278.
38	On a rocky hill at Dwaal R.	30. 8. 1811	1482—1490/2	N.B.—The country north of this river was considered Bushman land.
	Zak River	31. 8. 1811	1491—1493 and 1510—1515	On the plain, a <i>Pappophorum</i> , a grass not before recorded in S. Africa.
38—39	Kopjes Fontein [near P.O. Oekies]	4. 9. 1811	1494—1509	C.G. 1496 <i>Sisymbrium Burchellii</i> . First found 14. 7. 1811. C.G. 1502 <i>Lichtensteinia undulata</i> . Ic. 337.
40	Patrys Fontein [Partridge F.]	5. 9. 1811		C.G. 1521 <i>Aristida pilifera</i> . Tr., I, 288.
40—41	Brakke Rivier	6. 9. 1811	1516—1521	<i>Aristida ciliata</i> .
42	Leeuwe (Lion) Fontein	7—8. 9. 1811	1522—1525	
43	Bushman Klip Fontein [in Gemsbok Bergen].	9. 9. 1811	1526—1535	
43—44	Skiet (Skirmish) Fontein [near Carnarvon].	9. 9. 1811	1536—1545	C.G. 1536 <i>Mahernia oxalidiflora</i> . Tr., I, 295.
44—45	At northern end of Karreebergen Poort.	10. 9. 1811	1546—1554	C.G. 1572 <i>Rhigozum trichotomum</i> . He named it Drie-doorn. Tr., I, 299.
45	Eland's Valley	10. 9. 1811	1555—1578	
46	By Karl Krieger's Graf [Carels Graf]	11. 9. 1811	1579—1583	C.G. 1586 <i>Acacia viridiramis</i> . Tr., I, 300.
47	At Buffelsbout on a flat red sand mound.	12. 9. 1811	1584—1591 1592—1612/3	C.G. 1599 <i>Ferraria undulata</i> . Tr., I, 304.
48	Jonkerwater			Travelled day and night in search of water.
49	Groot Moddergat	13. 9. 1811		

Sheet 4.—From Moddergat to Klaarwater [Griquatown]. Divisions of Prieska and Hay.

Map Ref.	Place.	Date.	Herb. Nos.	Remarks.
49—50	Between Moddergat and the Poort [Keikams Poort].	13. 9. 1811	1612/4—1612/12	Grass on plain still dry.
	In the Poort	13. 9. 1811	1613—1621/2	C.G. 1615 <i>Aptosimum abietinum</i> . He lost his way after north end of pass and this affected collection.
50	At Zand Vley [near Soutput] ..	14. 9. 1811	1622—1632	C.G. 1628 <i>Acacia déknens</i> .
51	On banks of Gariep [Orange River]	15—16. 9. 1811	1633—1644	C.G. 1630/2 <i>Mes. turbiniforme</i> . Tr., I, 310. C.G. 1633 <i>Papaver Gariepium</i> .
51—52	Between 51 and Shallow Ford ..	17. 9. 1811	1645—1650	C.G. 1637 <i>Salix Gariepina</i> . Tr., I, 316. Ic. C.G. 1647 <i>Tarchonanthus</i> met for first time.
53	In the Asbestos Mts. near the Kloof [Noupoort].	25. 9. 1811	1651—1691	C.G. 1648 <i>Loranthus</i> . Ic. 368. C.G. 1653 <i>Aitonía capensis</i> . Ic. 371. Observed blight in corn—a species of mildew. Season good. Tr., II, 586, 89.
54	Akaap [Rietkuil].	29. 9. 1811		C.G. 1696 <i>Royena microphylla</i> = <i>R. hirsuta</i> .
53—55	Witterwater or Gattakamma	29. 9. 1811	1692—1695	C.G. 1697 <i>Spartium cuspidosum</i> = <i>Lebeckia macrantha</i> . Ic.
55—56	Klaarwater	30. 9. 1811	1696—1697	

Sheet 4.—From Klaarwater to Vaal River (up to Schmidts Drift) and Back. Division of Hay.

Map Ref.	Place.	Date.	Herb. Nos.	Remarks.
56—57	Spuigslang (Spitting snake) Fontein	24. 10. 1811	1698—1706	C.G. 1706 <i>Euclea ovata</i> . Saw it for first time.
57—58	Between Spuigslang and Ky-Gariep [Vaal].	25. 10. 1811	1707—1727	C.G. 1707 <i>Schepperia juncea</i> . Ic. 400. 418. C.G. 1710 <i>Acacia heteracantha</i> . First meeting.
58	On right bank of Vaal—at the confluence of Vaal and Orange R.	26. 10. 1811	1728—1730/2	C.G. 1713. <i>Rhigozum obovatum</i> . Ic. 398. Tr., I, 389. C.G. 1730/2 Fungus. The first he had found.
59	Zout Pan's Drift [Doughlas] ..	28. 10. 1811	1731—1747	C.G. 1736. <i>Vahlia</i> . Ic. 399.
	On the right bank of Vaal. At the drift.	29. 10. 1811	1748—1751	C.G. 1749. <i>Terminalia erythrophylla</i> . Ic. 393. Tr., I, 400.
60	On right bank of Vaal R. [near St. Claire].	29. 10. 1811		Great abundance of mat rush— <i>Scirpus tegelalis</i> .

61	At confluence of Vaal and Riet Rivers.	30.10.1811	(Riet River is Burchell's Modder.)
62	First Hippo Station on the Vaal [Middeldrift Area].	31.10.1811	
61—63	Second Hippo Station [near Modder-drift on the Vaal].	2.11.1811	C.G. 1754 <i>Talium</i> . Ic. 390.
63	Hippo Station [vicinity of Modder-plants].	3.11.1811	Comments on finding "three plants of English countenance," <i>Tr.</i> , I, 426.
64	Third Hippo Station [near Schmidts Drift on Vaal].	4.11.1811	Writes about the trees, especially on the acacias on the banks of the river. <i>Tr.</i> , I, 428.
64—65	Between Third Hippo Station and Fireless Station [due E. of Kranskop and to the north of Station 62].	5.11.1811	
66	Same as Station 61	8.11.1811	C.G. 1773 <i>Cyperus fastigiatus</i> .
	Between 66 and Vaal	13.11.1811	C.G. 1782 <i>Apocynum</i> . Ic. 401.
67	In the open Plain	13.11.1811	C.G. 1783 <i>Convolvulus</i> . Ic. 405.
67—68	On the plain towards Groote Fontein [Campbell].	14.11.1811	Plains of <i>Tarchonanthus</i> and <i>Rhigozum</i> . C.G. 1790 <i>Aizoon</i> —shrubby. <i>Tr.</i> , I, 454.
			Realises need for study of vegetable physiology.
68	Groote Fontein near the lower spring at foot of mountain.	16.11.1811	C.G. 1825 <i>Celastrus</i> —"remarkable for a profusion of very long thorns, 2 or 3 times as long as the leaves," <i>Cat. Geog.</i>
		18.11.1811	Mosses 1836/2, 1836/3, 1836/4, Lichen 1836/5.
69	At upper spring	18.11.1811	
	Midway between the Kora Groote Fontein and Klaarwater (about 26 miles east of Klaarwater).	19.11.1811	

Sheet 4.—Klaarwater [Griquatown] and the Asbestos Mountains. Division of Hay.

Map Ref.	Place.	Date.	Herb. Nos.	Remarks.
70	Klaarwater	20.11.1811		Because of an accident to one of his Hottentots, Burchell found <i>Diosma serratifolia</i> (Bockoe) Ic., useful as a disinfectant and astrigent. He also used <i>Artemisia Afra</i> as a wash. <i>Tr.</i> , I, 476.

Map Ref.	Place.	Date.	Herb. Nos.	Remarks.
70	Klaarwater, about $\frac{1}{4}$ mile north-westward from the Church.	1. 12. 1811	1837—1881/2	C.G. 1838 <i>Ipomoea suffruticosa</i> , Ic. 405/1. C.G. 1881/2 <i>Haemanthus toxicarius</i> , Ic. 405/2.
70	At Leeuwen Kuil Valley ..	12. 12. 1811 13. 12. 1811	1900 1901—1930	C.G. 1900 <i>Acacia atomiphylla</i> . C.G. 1930 <i>Mentha</i> which he distilled for Peppermint water, Tr., I, 493.
70	near the burial grounds ..	14. 12. 1811	1882—1899 1931—1945	In arranging his C.G. numbers, Burchell has given the dates in the wrong order.
70	At Klaarwater ..	2. 1. 1812	1946—1951	For Burchell's selection of what he regarded as new plants gathered at Klaarwater, see Tr., I, 226.
70—71	Jacob's Doorn—grazing post .. Groot Doorn—grazing post .. Between Klaarwater and Wittewater	5. 1. 1812 7. 1. 1812 14. 2. 1812	1952—1953/2 1854—1961 1962—1996	C.G. 1955 <i>Chenopodium Botrys</i> , Ic. C.G. 1968 <i>Ornithogalum nervosum</i> . C.G. 1970 <i>Uncaria procumbens</i> . He took seed and from it reared a plant in Fulham; it was still flourishing in 1860. C.G. 1978 <i>Briza nigra</i> , Ic. C.G. 2011 <i>Cleome heterotricha</i> = <i>Gynandropsis pentaphylla</i> . C.G. 2000 <i>Campanula denticulata</i> . C.G. 2017 <i>Bouchea pumila</i> (Lichtensteinia), Ic. 337.
71—72	Between Wittewater and Aakaap [Rietkuil].	15. 2. 1812	1997—2013	Region of poison bulb— <i>Am. toxicaria</i> . Here he added 40 new plants to his collection; nearly all of them had hitherto been unknown to science
72	Between Aakaap and The Kloof, Asbestos Mts. At the Kloof, Asbestos Mts. ..	15. 2. 1812 16. 2. 1811	2014—2019 2020—2065	C.G. 2037 <i>Celastrus</i> , Ic. 376. C.G. 2092 <i>Ceropegia infundibuliformis</i> .
72—74	At a Pond of rain water halfway between the Kloof and Wittewater. Between Asbestos and Wittewater Klaarwater ..	17. 2. 1812 18. 2. 1812 19. 2. 1812	2066—2101 2110—2114	When passing over the same ground for the third time, Burchell added 36 numbers to his collection, so he points out the necessity for going over the ground at different seasons. In this area he collected several bulbs and the seeds of many plants. Tr., I, 536, 537.

Sheet 4.—From Klaarwater to Grass Station. Divisions of Hay and Prieska.

Map Ref.	Place.	Date.	Herb. Nos.	Remarks.
75	Wittevate:	24. 2. 1812		Comments on the flowering season of the <i>Amaryllis</i> being ended within ten days of his last visit. Speaks of the utility and beauty of the <i>wire grass</i> in this area. <i>Tr.</i> , II. 7.
76	The Kloof, Asbestos Mts. ..	25. 2. 1812		
76—77	Jan Bloem's Kraal [4 miles north of Orange R., Sanddrift area].	26. 2. 1812	2102—2109	C.G. 2106 <i>Salsola aphylla</i> . For 2110—2114 see Klaarwater 16. 2. 1812. Burchell considered the Orange River was "a botanical limit, in a multitude of instances." He assigned the name <i>Transgariet</i> to the region north of the Orange R. and <i>Cisgariet</i> to that lying south of the river and north of the boundary of Cape Colony. <i>Tr.</i> , I. 324.
78	River crossed, 2½ miles up from English Ford [near Swemkuil].	27. 2. 1812		On the plain was an abundance of <i>Capparis albitrunca</i> or <i>Wit-gat boom</i> .
79	Rizzo's Kraal	28. 2. 1812		
79—80	First station on the "Friendly River," [Brak River].	29. 2. 1812		Only shelter a few stunted <i>Rhigozum tri-chotomum</i> . Excellent grass; <i>Rhus viminalis</i> ; <i>Zizyphus bubalinus</i> ; <i>Lycium</i> ; <i>Salix Garietina</i> and <i>Acacia Capensis</i> . <i>Stapelia</i> : Particularly large flowers of a blackish-red colour and another with yellow flowers growing in lateral umbels. Burchell kept to the Brak River which formed the eastern branch of the Great Brak or Ongers River. His mode of travelling from Klaarwater to Graaff-Reinet and back, did not allow of his collecting or preserving many specimens.
81	Driedoorn	1. 3. 1812		
82	Klein Varskuil	2. 3. 1812		
82—83	Grass Station (Lat. 30') ..	2. 3. 1812		

Sheet 5.—From Poverty Kraal to Klein Tafelberg—approximately from Lat. 30° to Lat. 31° 30'. Divisions of Britstown and Richmond.

Map Ref.	Place.	Herb. Nos.	Date.	Remarks.
84	Bushman's Poverty Kraal [near Zwaartelstaart].	3. 3. 1812	3. 3. 1812	
85	Astrild	4. 3. 1812	
85—86	Hunter's Station [vicinity of Baverspoort].	5. 3. 1812	5. 3. 1812	
87	Kaabi's Kraal [near Smous Poort]	6—8. 3. 1812	6—8. 3. 1812	
88	Reed Station [near Hondeblaf R.].	9. 3. 1812	9. 3. 1812	
89	Quakka Station [Middelwater] ..	10—11. 3. 1812	10—11. 3. 1812	
90	Kraaikop's Kraal [Honingsstad Kop]	12—13. 3. 1812	12—13. 3. 1812	
91	Halfway Spring [near Brandfontein; W. of De Aar].	14. 3. 1812	14. 3. 1812	
92	Rhenoster Poort [near Zwartkoppies]	14. 3. 1812	14. 3. 1812	
93	South Station [near Oloff railway station].	15. 3. 1812	15. 3. 1812	
94	Geranium rocks [S. of Mynfontein]	16. 3. 1812	16. 3. 1812	
95	Boundary Station [approx. E. of Geelfontein].	17. 3. 1812	17. 3. 1812	
96	Groot Tafelberg—van Wyk's ..	18. 3. 1812	18. 3. 1812	
97	Pond Station [near Grootfontein]	19. 3. 1812	19. 3. 1812	
98	Grootfontein	19. 3. 1812	19. 3. 1812	
99	Klein Tafelberg—Vermeulen's ..	19. 3. 1812	19. 3. 1812	

A few miles beyond this, through an opening between an insulated round hill and a rocky ridge, a verdant plain was entered. Burchell considered it would make excellent agricultural land.

Mesembryanthemum observed in the "Karoo ground."

Luxuriant grass and reeds.

Salvia. C.G. 2119/5 *Loranthus canescens*.

Geraniums similar to C.G. 2693 *Pelargonium tragacanthoides*.

"Extraordinary abundance of *Cyperus usitatus*."

Much *Rhus* similar to C.G. 2697 *Rhus serrafolium*.

Pasture more suitable for sheep than cattle.

Sheet 6.—From Klein Tafelberg to Graaff-Reinet and back to North. Divisions of Richmond, Graaff-Reinet, Murraysburg and Hanover.

Map Ref.	Place.	Herb. Nos.	Date.	Remarks.
100	Zeekoe Rivier [Dassiefontein on the upper reaches of Elandsloof R.—a branch of Sea-Cow R.].	20. 3. 1812	20. 3. 1812	

101	Herholdt's [Ruigtevallei—Meiring's farm].	21. 3. 1812	Herholdt's farm had a garden with poplars, pines, willows, peaches and roses. <i>Festuca ovina</i> Linn. in the valleys. Real "turf" or sod. Noted, but could not collect: <i>Portulacaria Afra</i> , <i>Grewia robusta</i> , <i>Celastrus linearis</i> . C.G. 2912 <i>Tetradinaria</i> : full notes. Tr., II, 147, 1c. He was travelling by Cape cart, so he had "little time for making remarks of any kind, as they flew past every object."
102	[Nieuweberg]	21. 3. 1812	
103	[Zuurplaats]	22. 3. 1812	
104	Gold Station [near Spruit van Gats R.]	22. 3. 1812	
105	Oudeberg Pass [South end] ..	23—24. 3. 1812	
106	Graaff-Reinet	25. 3. 1812	2115—2118 He travelled by wagon along a rough track from what is now Waterkrans to Ruigtevallei.
107	Waterfall [Fendale] [either Groot-plaats or Vleiplaas].	1. 4. 1812	
		28. 4. 1812	
108	[Near Witteklip]	29—30. 4. 1812	
109	[Near Philipskraal]	1. 5. 1812	
110	North side of Muishoek Berg ..	2. 5. 1812	
111	Herholdt's [Ruigtevallei—Meiring's same as 101]	2. 5. 1812	C.G. 2121 <i>Adiantum</i> .
112	Klein Tafelberg—Vermeulen's (same as 99).	3. 5. 1812	
113	Groote Fontein (same as 98) ..	4. 5. 1812	
114	Wortel (Carrot) Fontein	5. 5. 1812	
115	Elandsfontein	5. 5. 1812	
116	Nieuwjaarsfontein	6. 5. 1812	

Sheets 5 and 4.—From Rhenoster Poort (near De Aar) north to Klaarwater [Griquatown]. Divisions of Britstown, Hopetown, Prieska and Hay.

Map Ref.	Place.	Date.	Herb. Nos.	Remarks.
117	Rhenoster Poort [same as 92] ..	7. 5. 1812		He travelled now at the average rate of 25 miles a day.
118	Half Way Spring [near De Aar, same as 91].	7. 5. 1812		
119	Kraaikop's Spring [N. of Honingstad Kop]	8. 5. 1812		
120	Quakka Station [same as 89] ..	9. 5. 1812		
121	Vulture Station	10—13. 5. 1812		
122	Three Fire Station [Knap Daar] ..	13. 5. 1812		
123	Kaabi's new kraal	14. 5. 1812		
124	Lion Station	15—16. 5. 1812		

Map Ref.	Place.	Date.	Herb. Nos.	Remarks.
124—125	Rushy Station [Groot Varskuil]	17. 5. 1812	2122, 2123, 2126, 2127	Species of <i>Mesembryanthemum</i> covered the plain. <i>M. veruculatum</i> . C.G. 2123 <i>Marsilea quadrifolia</i> (<i>macrocarpa</i> Presl. var. <i>Burchellii</i>). C.G. 2124 <i>Pelargonium</i> . On the Island at English Drift. C.G. 2128 <i>Cyperus scirpoides</i> .
126	Lower Station on Brak River	18. 5. 1812		
127	Ox Ford on the Gariep 4½ miles from English Drift	19—20. 5. 1812		
128	The Kloof in the Asbestos..	21. 5. 1812		
129	Witewater	22. 5. 1811		
130	Klaarwater	23. 5. 1812		
		24. 5. 1812		

Between the Orange River and the Sunday River no Acacia had been seen.

Sheets 4 and 7A.—From Klaarwater to Kuruman. Divisions of Hay and Kuruman.

Map Ref.	Place.	Date.	Herb. Nos.	Remarks.
130	Klaarwater	3. 6. 1812	2129	<i>Crassula</i> .
130—131	Moses' Fontein [Moosfontein]	6. 6. 1812	2130—2134	Shrubs chiefly <i>Tarchonanthus</i> and <i>Rhus tri-dactyle</i> .
131—132	Ongeluk	8—14. 6. 1812	2135—2135/3	C.G. 2135/2 <i>Acacia elephantina</i> , <i>Mentha Capensis</i> , <i>Zanichellia</i> .
133	Doorn River	14—16. 6. 1812	2136	C.G. 2136 Kameel Doorn Trees. <i>Andropogon. A. hirtus</i> .
134	A Station without water [near Connie].	16. 6. 1812		Doornboom trees The track was not much beaten and was nearly obliterated by grass.
134—135	Bloem's Fontein [Grootfontein]	17. 6. 1812	2136/2—2139	<i>Acacia stolonifera</i> . Ic.
136	Sensaván or Blink-klip [near Post-masburg].	18. 6. 1812	2140—2143	C.G. 2141 <i>Hermannia bryoniaefolia</i> . C.G. 2142 <i>Vangueria infausta</i> . Ic. 607. C.G. 2153 <i>Melhania prostrata</i> . Ic. 485.
137	Klip Fontein (Kora, Rock Fontein)	19. 6. 1812	2144—2166	C.G. 2154 <i>Croton gratissimus</i> . Ic. 486. C.G. 2160 <i>Ocimum fruticulosum</i> .
137—138	Knechts Fontein [N. of Kopje Alleen]	20. 6. 1812	2167—2170	Grass lands of Genera <i>Andropogon</i> , <i>Aristida Andhisitria</i> , <i>Poa</i> .
139	Kosi Fountain [Khosis]	21—28. 6. 1812		C.G. 2170 <i>Cissampelos calcarifera</i> . <i>Arundo barbata</i> Ic. under date 10. 9. 1841. Tr., II, 271. Sowed peach, quince, almond and kitchen garden seeds near the spring.

139—140	Tarchonanthus Station	28. 6. 1812	2171	Kameel Doorn trees. Flowering season over, and only dry and crisp leaves remain on the deciduous shrubs.
140—141	Little Klibbokkhoni Font. [Oog-kop ?]	29. 6. 1812	2172—2182	
142	Kruman Station [Vicinity of Seodin]	30. 6. 1812	2183—2187	C.G. 2184 <i>Melicoides Tricholena rosea</i> . C.G. 2185 <i>Evolvulus</i> —"the first proof of the existence of that genus on the African Continent." <i>Tr.</i> , II, 306 n.

Sheet 7b.—From Kuruman to Litakun (Takoon), thence to Chué Spring [Heuningvlei] and return to Kuruman.
Division of Kuruman and Native Reserves.

Map Ref.	Place.	Date.	Herb. Nos.	Remarks.
143	At the Kruman (Kuruman R.) ..	29. 6. 1812	2183—2187	C.G. 2185/1 <i>Evolvulus alsinoides</i> . First proof of this genus in the African Continent.
143—144	Makktwaarin River [Mecwetsaneng ?]	1. 7. 1812	2188—2192	C.G. 2191 <i>Mes. aloides</i> Ic. et Kew.
	At the River	5. 7. 1812	2193—2198	C.G. 2193 <i>Crassula</i> . Ic. of plant grown from its seed; S. 219. <i>Tr.</i> , II, 235.
144—145	Sikkioniéi Fountain [S. of Motito : N. of Depatholong "A" Mt.].	10. 7. 1812	2199—2202	Grassy Plain. C.G. 2202 <i>Tarchonanthus</i> 10—12 ft. high. <i>Tr.</i> , II, 340.
146	Lobutsani [a Fountain in the Pollat Plains].	12. 7. 1812		Spent time arranging material for trade in Litakun.
146—147	Litakun (Takoon)	13. 7. 1812	2203—2204	C.G. 2203 <i>Passerina</i> ? : met for first time <i>Tr.</i> , II, 341.
147	At Litakun	24. 7. 1812	2205—2220	C.G. 2205 <i>Acacia Litakunensis</i> —40 ft. : C.G. 2213 <i>Dolichos</i> Ic. C.G. 2214 <i>Holcus caffrorum</i> . Ic. <i>Tr.</i> , II, 586—589. Seeds Nos. 268-283, see <i>Hortus Fulhamensis</i> MSS.
148	At Bachapin (Batlapin) cattle station	3. 8. 1812		
149	Acacia Fountain [Between Peaks of Depatholong and Depatholong "A"].	4. 8. 1812		
150	Pintado (Guinea Fowl) Fountain [near Heiso].	8. 8. 1812	221, 2221/2	C.G. 221 <i>Tillaea rotundifolia</i> . Ic. 515. C.G. 2221/2 <i>Muscus</i> .

Map Ref.	Place.	Date.	Herb. Nos.	Remarks.
150	Thermometer Fountain [near Skiet Mekaar].	9. 8. 1812	2222—2221/1	"Set off at noon, and travelling sometimes through thickets of <i>Mimosa retorta</i> and <i>Tarchontanthus</i> (now white with down) and sometimes through large fields of mock-red wheat, we arrived at 3½ p.m. at a clump of tall trees where is a small spring." <i>Unpublished Journal</i> .
151—152	The Garden [near Pakhamie Kop].	10. 8. 1812	2233/1, 2233/2	Rainy season. Collected mostly bulbs. Moss observed.
152—153	Thermometer Fountain (see 151).	27. 8. 1812	2244—2245/2	C.G. 2240 <i>Gladolus edulis</i> , Ic. 527. C.G. 2242 <i>Mes.</i> Ic. 534. C.G. 2243 <i>Doris virgata</i> , Ic. 526. He sowed seeds of tamarind, cotton, cabbage, lettuce, radish, water-melon: planted onions and potatoes.
153—154	Pintado Fountain (see 150)	28. 8. 1812	2246—2249/1	Saw grass fires in the distance. C.G. 2247/2 <i>Hypoxis obtusa</i> , Ic. Differs from Cape species in opening and remaining so in all weathers. Bot. Reg. t. 159.
155	Jabiru Fountain	29—31. 8. 1812 1. 9. 1812	2249/2—2249/8 2250/1, 2250/2	C.G. 2249/2 <i>Massonia jasmiflora</i> Ic. C.G. 2249/4 <i>Iris</i> , Ic. 540. C.G. 2250/1 <i>Moraea</i> Ic. 549. C.G. 2250 <i>Sisyrinchium</i> Ic. 545.
156	At Mashowa [Mashowing R.] Litakun	6—8. 9. 1812	2252/1—2252/6 2253—2256	C.G. 2251 <i>Gladolus glaucus</i> , Ic. 550. C.G. 2256/2 <i>Cyanella lutea</i> , Ic. 552.
156	Litakun	9. 9. 1812	2256	C.G. 2265 <i>Acacia robusta</i> .
156	On the Rocky Ridge at Litakun	11. 9. 1812	2257—2265	C.G. 2268 <i>Aptosimum depressum</i> .
156	Between Litakun and the stone buildings of the ruinous town on the Moshwa River.	15—18. 9. 1812	2266—2272	CG. 2270 <i>Tephrosia lupinifolia</i> .
157	At the Source of the river Moshowa [Mashowing].	27. 9. 1812	2273—2280	C.G. 2280 <i>Malernia resedaefolia</i> .
158	Oxen Station [N.E. from Motito]	29. 9. 1812	2281—2289	C.G. 2282 <i>Polygonum amphydium</i> .
158—159	Mokaala Station [vicinity Battlemond P.O.]	29. 9. 1812	2290—2291	C.G. 2290 <i>Sutera atropurpurea</i> . C.G. 2291 <i>Pergularia jasmiflora</i> , Ic. 592.
159—160	Olive-tree Station [on Mashowing R.]	30. 9. 1812	2292—2316	<i>Acacia Graaffiae</i> ; <i>Acacia elephantina</i> .
160—161	Last-water Station [Wells on Lolwaning Laagte].	1. 10. 1812	2317—2330/3	C.G. 2324 <i>Vahlia</i> . C.G. 2325 <i>Lantana salicifolia</i> —fruit bearing specimen.

Sketch Map of Burchell's Trek.

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162	Halt.				2.10.1812	2331—2340	C.G. 2333 <i>Mahernia grandiflora</i> var. <i>Burchellii</i> , Bot. Reg. t. 224.
161—163	Desert Station					C.G. 2336 <i>Crotalaria spartioides</i> . C.G. 2341 <i>Gladiolus</i> (Tritonia).
163—164	Giraffe Station [S. of Ewbank's Stores].	In a walk from Station to N.E. ..			3.10.1812	2341—2349	
165	Chué Spring [Heuning's].	On the Mountain [Makuba Range]			4.10.1812 6.10.1812	2350—2361 2362—2377	C.G. 2365 <i>Hibiscus</i> . C.G. 2378 <i>Waltheria conger</i> , <i>W. indica</i> , leaves used by Bushmen for snuff. Ic. 570. C.G. 2389 <i>Ceratolacca triloba</i> . C.G. 2398/2 <i>Cucumis</i> , Eph. 80.
166	On the rocks at Chué Spring ..	On the Maadje Mis. [Makuba Range]			7.10.1812 18.10.1812	2378—2391 2392—2396	
165	On the Rocks at the Spring ..	by the Chué Spring.			27.10.1812	2398/2 2397—2398/1	
165—167	Terminalia Station				27.10.1812	2399, 2400	C.G. 2397 <i>Acacia heteracanthus</i> . C.G. 2398/2 <i>Rhigozum spinosum</i> . C.G. 2399 <i>Terminalia sericea argentea</i> 15—20 ft. high Eph. Bot. p. 36.
167—168	Hot Station [on Mashowing R.] ..	Between Royena Halt [Holt] and			28.10.1812	2401—2405	C.G. 2402/3 <i>Acacia giraffæ</i> , Eph. Bot. p. 37.
169—170	Sand Station	Sand Station			30.10.1812	2406—2409	C.G. 2408 <i>Lessertia macrostachya</i> . C.G. 2409 <i>Royena</i> .
170—171	Between Sand Station and Kuru [near Vaalkop]				31.10.1812	2410—2413	<i>Acacia elephantina</i> , <i>Cissampelos</i> , <i>Convolvulus</i> , <i>Valeria</i> .
172	Broku's Kraal			1.11.1812 2.11.1812		C.G. 2414 <i>Bathrinia esculenta</i> is Tama of Bechuanaland. Burchell says it was hitherto unrecorded.
172—173	Patani [near Lower Ditkgation Store]				6.11.1812	2414—2415	C.G. 2416 <i>Ceropogia</i> —"a new genus." <i>Cat. Geop.</i>
174	Mokaala Grove [near Kuruman R. vicinity of Gamopedi Mt.]				9.11.1812 13.11.1812	2416	<i>Euclea myrtina</i> at Mokaala Grove.
175	Pitfall Station [near Gamopedi P.O. and Store N.W. of Batlaros Mission].				15.11.1812		
176	Peak Station [near Kuruman Kop and ruins of old town].				16.11.1812	2417—2426	<i>Convolvulus</i> , <i>Evolvulus</i> , <i>Triaspis</i> , <i>Campanula</i> .
176—177	Little Klibbolikhonni [Oogkop] .. (142).				17.11.1812	2427—2435	C.G. 2430 <i>Dipyrzis</i> . Ic. 594. "Dipyrzis is the same genus as <i>Bolivia</i> in Linnae, Vol. I, t. 4." Eph., p. 39.

Sheets 7A and 4.—From vicinity of Kuruman to vicinity of Petrusville. Divisions of Kuruman, Hay, Hopetown, Philipstown.

<i>Map Ref.</i>	<i>Place.</i>	<i>Date.</i>	<i>Herb. Nos.</i>	<i>Remarks.</i>
177	Kibbolikhonni [2 miles east of Little Klib. and Sources of Kuruman R.].	18.11.1812	2436—2451	C.G. 2444 <i>Asclepias Raphionacne</i> : at the Spring.
177—182	In walk from Kibbolikhonni to the Garden (152).	20.11.1812	2452—2481	Along the Plain.
177—178	In a walk to, and on a black rocky hill under the Kamhami Mts. [Kuruman Hills] Fig-tree Rock.	24.11.1812	2482—2485/1	C.G. 2456 <i>Dianthus</i> .
		27.11.1812	2485/2	C.G. 2459 <i>Oxigonum calcaratum</i> .
		1.12.1812	2486—2495/2	C.G. 2486/2 <i>Pascanthus repantus</i> . Ic. 599.
		12.12.1812		C.G. 2489 <i>Xynobium ensifolium</i> . Ic. 598.
				C.G. 2493/2 <i>Croton gratissimus</i> . Ic. 602—details.
177	Kibbolikhonni	14.12.1812	2496—2499	C.G. 2498 <i>Macropetalum strictum</i> . Ic. 601.
177	Little Kibbolikhonni [Oogkop] ..	15.12.1812	2500—2507	<i>Asclepias</i> , <i>Equisetum</i> , <i>Crotalaria</i> .
177—179	Kosi Fountain (140)	16.12.1812	2508—2524	C.G. 2532 <i>Amaryllis coranica</i> . Bot. Reg. 139 Ic.
		20.12.1812	2525—2548	C.G. 2557 <i>Althaea Burchellii</i> .
		21.12.1812	2549—2580	C.G. 2576 <i>Talinum</i> . Ic. 605. <i>Eph.</i> , p. 40.
		25.12.1812	2581—2600	C.G. 2585 <i>Microstoma Burchellii</i> .
179—180	Knegts Fountain (140)	25.12.1812	2601—2608	C.G. 2598 <i>Bulbostylus Burchellii</i> .
180—181	Klip Fountain (136)	26.12.1812	2609—2617	<i>Andropogon</i> , <i>Poa</i> , <i>Cassia</i> .
		27.12.1812		<i>Hedyotis virgata</i> , <i>Panicum</i> , <i>Monsonia</i> .
		29.12.1812	2618—2638	<i>Hibiscus</i> , <i>Cheilanthes</i> , <i>Lycoperdon formicarum</i> . Ic. 606.
181—182	About Grootfontein (135)	31.12.1812	2639—2642	<i>Scirpus</i> .
	and Doorn River (133)	1. 1.1813	2643	C.G. 2643 <i>Calendula</i> .
183	Ongeluts Fontein (132)	1. 1.1813	2644—2649	C.G. 2648 <i>Zinnichellia palustris</i> .
184	Moses' Fontein (131)	3. 1.1813		
		4. 1.1813		Burchell's note in <i>Cat. Geog.</i> : "All the above specimens were scattered by a whirlwind on 30.1.1813 and were mixed with one another, but have been since, in England, restored to their proper order."

Sheet 5.—From Bare Station, west of Petrusville to Groote Fonteyn near Middelburg. Divisions of Philipstown, Colesberg and Middelburg.

Map Ref.	Place.	Date.	Herb. Nos.	Remarks.
199-200	Bare Station [E. of Ongeluk's Kop]	2. 3. 1813	2677-2682	West of Petrusville.
200-201a	Gnu Hail	3. 3. 1813	2683-2687/2	C.G. 2683 <i>Am. Strumaria</i> , Bulb 40.
201b	Horse's Grave [near Vlakteleplaats]	3. 3. 1813	2688-2700/2	C.G. 2700 <i>Cussonia montana</i> , Ic. 624.
		6. 3. 1813	2701-2703/3	C.G. 2703/3 <i>Am. Brunsvigia</i> , Ic. Bulb 41.
202	Rainwater Station [W. side of Philipstown].	7. 3. 1813	2704-2717	
202-203	Waschbanks River	7. 3. 1813	2718-2725	From this vicinity he took bulbs and seeds.
	Waschbanks—on the Mountain ..	7. 3. 1813	2726-2732	<i>Anargyllis Brunsvigia</i> : <i>A. coranica</i> and <i>Massonia comata</i> .
	At Waschbanks River [S. of Twoefontein Mt.].	8. 3. 1813	2733-2741	
204	Toad Station [near Gras Pan] ..	10. 3. 1813		Seeds taken.
205	Bontobok Station (north of Uitziqt)	11. 3. 1813	2742-2747	Here Burchell re-entered the Colony.
206	Piettenberg Baaken			
207	Piet Jouberts [S. side of Baaken]			
208	Piet Venter's [near Plaawekop] ..	17. 3. 1813		
208-209	Flat Station [near Boskop to N. of Bulhoek.]	18. 3. 1813	2748-2750	
	At Flat Station	19. 3. 1813	2750/2	
210	Carolus Poort	19. 3. 1813	2751-2758	C.G. 2750/2 <i>Massonia nectarifera</i> , Ic.
211	At Naauwe Poort on the rocky mountain near the farm house.	20. 3. 1813	2759-2782	C.G. 2751 <i>Massonia comata</i> , Ic.
	On the Southern side of Naauwe Poort by the roadside.	20. 3. 1813	2783-2784	C.G. 2783 <i>Hemimeris</i> — <i>Nemesia hastata</i> , type.
212	Twice Fonteyn [P.O. Ludlow] ..	20. 3. 1813		He took bulbs from this area.
211-213	Wolvskop [Sherborne]	21. 3. 1813	2785-2786	
214	Groote Fontein [n. side of Middelburg]	22. 3. 1813		

Sheet 6B.—From Grootefontein to Graaff-Reinet. Divisions of Middelburg and Graaff-Reinet.

Map Ref.	Place.	Date.	Herb. Nos.	Remarks.
214-215	Rock Station [Barendskraal] ..	23. 3. 1813	2787-2793	C.G. 2791 <i>Buddleia salicifolia</i> .
	At Rock Station	24. 3. 1813	2794-2799/2	
215-216	Zeven Fonteynen [Rietvlei] ..	24. 3. 1813	2800-2803/3	C.G. 2802 <i>Kiggelaria africana</i> : 8 ft.

216—217	Between Zeven Fontein and foot of Wagenpadsberg. On Wagenpadsberg at Mountain-horse (Zebra) Station.	26. 3. 1813	2809—2812	C.G. 2812 <i>Becium burchellianum</i> .
217	At Mountain-horse (Zebra) Station Near Wagenpadsberg on the Southern side.	26. 3. 1813 28. 3. 1813 28. 3. 1813	2813—2821 2822—2825 2826—2836	C.G. 2821 <i>Phytolacca heptandra</i> . C.G. 2824 <i>Myosotis sylvatica</i> . C.G. 2826 <i>Euryops oligoglossus</i> . C.G. 2831 <i>Moraea polystachya</i> . C.G. 2837 <i>Cucumis odorata</i> . C.G. 2839 <i>Othonna Euryops</i> ?
218	At Hyena Station In the descent from Succowberg near Hyena Station [near Lets-kraal].	29. 3. 1813 29. 3. 1813	2837 2838—2860	
219—220	Along Zondag Rivier northward of Monkey Ford.	30. 3. 1813	2861—2872	C.G. 2867 <i>Tritonia</i> . C.G. 2868 <i>Osteospermum Burchellii</i> . C.G. 2872 <i>Celastrus</i> . Tr., II, 133.
220	Along the Zondag R. between Piet Pret. and Monkey Ford.	30. 3. 1813	2873—2896	C.G. 2890 <i>Rumex Burchellii</i> . Ic.
221	On the Mts. on S.W. side of G.R. . .	1. 5. 1813	2897—2938	C.G. 2899 <i>Pappia capensis</i> (Wilde Prum). C.G. 2913 <i>Rajania Testudinaria</i> . Ic.
	By the Sunday River at G.R. . .	7. 5. 1813	2939—2940	

Sheet 6.—From Graaff-Reinet to Ripon. Divisions of Graaff-Reinet, Pearston, Somerset East.

Map Ref.	Place.	Date.	Herb. Nos.	Remarks.
222	Kruidfontein	12. 5. 1813		
222—223	Karameelk River [Melks R.]	13. 5. 1813	2941—2949	
223	Karameelk R.	14. 5. 1813	2950—2954	
223—224	Platte Rivier	14. 5. 1813	2955	C.G. 2955 <i>Haemanthus albiflos</i> . Bot. Reg t. 984.
224	At Platte Rivier	15. 5. 1813	2956—2961	
225	Vogel R. [near Pearston]	15. 5. 1813		
226	Buffels Hoek			

On his field sheet, but not on his published map, there is an indication that, while at Vogel R., Burchell made an excursion towards Buffels Hoek Nek. No entries are made in the *Cat. Geog.*

<i>Map Ref.</i>	<i>Place.</i>	<i>Date.</i>	<i>Herb. Nos.</i>	<i>Remarks.</i>
227	Blyde River	16. 5. 1813 17. 5. 1813	2962—2984	C.G. 2964 <i>Scolia</i> "Boerboontjes" edible. C.G. 2975 <i>Perlargonium</i> —"Apple scented P. hortulanis ex Sal." Between Blyde R. and Bruintjes-hoogte Burchell marks a stopping place "Allo- mandsfontein" (Almondsfontein on modern maps), but it is not mentioned in the <i>Cat. Geog.</i> <i>Pelargonium</i> .
227—228	Bruinjtes Hoogte [P. Office] At the Station on the lower part of Bruinjtes-hoogte Berg.	17. 5. 1813 19. 5. 1813	2985 2986—3025	C.G. 2988 <i>Mahernia violacea</i> . From seed of this, grew a plant in Fulham. Ic.
229	On the upper part of Bruinjtes-hoogte Berg above the Station.	20. 5. 1813	3026—3104	C.G. 3104/2 Noted <i>Cissots</i> , <i>Zamia</i> , <i>Aloe</i> . C.G. 3104/3 <i>Musci</i> .
229	Lichen Grove: a woody ravine by the side of the road over Bruinjtes- hoogte Berg.	23. 5. 1813	3105	
230	Hollow Station [near Piet van Aardt]	24. 5. 1813	3106—3118	Collected seed of <i>Lycium</i> , <i>Celastrus</i> , <i>Zizyphus</i> , <i>Iris</i> .
231	Baron de Clerq's Plaas—Kleine Visch R.	24. 5. 1813		
232	Doornboom Grove [Somerset East]	25. 5. 1813		This was his headquarters from 25th May till 21st June 1813.
233	Boschberg In the forests near the Station	26. 5. 1813 29. 5. 1813	3119—3167/10 3168—3174	C.G. 3167/2—3167/6 <i>Fungi</i> . C.G. 3167/7, 3167/8 <i>Lichens</i> . C.G. 3167/9, 3167/10 <i>Musci</i> . C.G. 3170 "Stink wood or Nieshout." <i>Tr.</i> , L. 72.
	In a walk along the southern side of Mts. and eastward from Station.	4. 6. 1813		C.G. 3174 <i>Podocarpus falcatus</i> . C.G. 3175 <i>Calodendron capensis</i> . C.G. 3178 <i>Cuscuta cassyloides</i> . C.G. 3183 <i>Galopina circacoides</i> . C.G. 3188 <i>Cassine</i> . C.G. 3199/2 <i>Fungus</i> . C.G. 3203 <i>Piper reflexa</i> , Eph. 46. C.G. 3219 <i>Euclea racemosa</i> . C.G. 3224 <i>Priva leptostachya</i> .
	In a woody ravine, close to the Station.	5. 6. 1813	3175—3182	
	On the side of Mt., near the Station	7. 6. 1813	3183—3187	
	On Boschberg	9. 6. 1813	3188—3191	
		10. 6. 1813	3192—3211	
		12. 6. 1813	3212—3225	

Along the woody ravine below the Station.	11. 6. 1813	3226—3233	
On Boschberg	13. 6. 1813	3234—3236	C.G. 3234 <i>Cynoglossum micranthum</i> . C.G. 3236 <i>Flagora</i>
In the wood close by the Station	14. 6. 1813	3237—3240	C.G. 3239 <i>Solanum aculeatissimum</i> . C.G. 3241 <i>Halleria lucida</i> . Eph. 48.
At the spring just below the Station	16. 6. 1813	3241—3243	C.G. 3242 <i>Cardamine africana</i> .
Vicinity of Andrew's Post [near Slagter's Nek]	21. 6. 1813	3244—3246/3	C.G. 3244 <i>Ehrlaria erecta</i> . Fungus. Rhus.
On western side of Gt. Fish River at van Aardt's [Harsfield]	21. 6. 1813	3247—3253	On 26th May he received an invitation from Capt. Andrew to visit the military post.
On the banks of Gt. Fish River at van Aardt's.	23. 6. 1813	3254—3259	C.G. 3247 <i>Monetia barleroides</i> . He gathered many seeds here.
Stockenström's Station [near Middleton].	24. 6. 1813		C.G. 3256 <i>Cliffortia strobilifera</i> .
Piet Gous [n. of Sheldon]	28. 6. 1813		Between 237—239 "Spekboom Flats" [<i>Portulacaria Afra</i>].
Martinus van der Merwe [Sheldon]	29. 6. 1813	3260—3271/1	In <i>Cat. Geog.</i> is a label inserted and on which is the following: "Description from 3260 to 3288 = 28 missing."
Otter Station [near Ripon]	30. 6. 1813		C.G. 3268 <i>Stoebe rhinocerotis</i> or <i>Elytropappus Rhinocerotis</i> . "This was the first <i>Stoebe</i> seen on my return from the Interior."
239—240 Commadagga	4. 7. 1813	3272—3288	

Sheet 8.—From Commadagga to Gamtoos River. Divisions of Albany, Bathurst, Port Elizabeth, Uitenhage.

Map Ref.	Place.	Date.	Herb. Nos.	Remarks.
240	Commadagga	5. 7. 1813	3289—3323	A few drawings of specimens gathered while en route for Cape Town, are still extant.
240—241	On the Mt. close above the Spring Zwaartwater Poort	6. 7. 1813	3324—3352	These will be indicated.
	On the rocks in the Poort	7. 7. 1813	3353—3354	
	On the rocks in the Poort	8. 7. 1813	3355—3388	
241	In the Poort	9. 7. 1813	3389—3408	
	On the sides of the rocks which form the Poort.	10. 7. 1813	3409—3429	
241—242	Soutar's Post [East of Riebeeck East]	13. 7. 1813	3437—3458	

Map Ref.	Place.	Date.	Herb. Nos.	Remarks.
242	Near the Spring at Soutar's Post..	25. 7. 1813	3459—3464	
	On the Mountain	28. 7. 1813	3465—3509	
242—243	Kurukuru River [Gaitou R.] ..	31. 7. 1813	3510—3512	
		1. 8. 1813	3513—3528	
	Along the rivulet on the upper side of Graham's Town, by Capt. Harding's.	27. 8. 1813	3529—3563	
244	Graham's Town: in woody kloof on west of my station.	30. 8. 1813	3564—3606	C.G. 3590 <i>Limodorum (Mystacidium filicorne)</i> Ic. 645.
	Graham's Town [near Drostdy] ..	6. 9. 1813	3607	
		8. 9. 1813	3608—3611	
244—245	Blauwe Krantz	8. 9. 1813	3612—3624	
	At Blaauwe Krantz.. ..	10. 9. 1813	3625—3627	
	In a walk to the Kowie Poort ..	11. 9. 1813	3628—3650/2	
	[2 miles to S.E. near East bank of Kowie River].	12. 9. 1813	3651—3670	
	In a woody ravine by the Spring at Blaauwe Krantz.	19. 9. 1813	3671—3679	
245—246	Kaffirs Drift (Old Drift—Fort Cawood)]	21. 9. 1813	3680—3718	
247	At the mouth of Great Fish River (on Western side).	22. 9. 1813	3720—3761	
248	Kaffirs Drift (same as 246) ..	22. 9. 1813	3762—3776	In his <i>Mem. Bot. MSS. Eph.</i> , p. 54, is a small drawing to illustrate C.G. 3776 <i>Phoenix reclinata</i> .
248—249	Kowie Station	23. 9. 1813	3777—3785	On 25th September 1813 he tried to cross the Kowie River and nearly lost one of his waggons. As some of his material was damaged by water, he gave up his attempt to reach the other side.
249	Kowie	26. 9. 1813	3786—3803	
		27. 9. 1813	3804—3836	C.G. 3805 <i>Minusops</i> . Ic. 651. Pub. in <i>Journal of S.A. Botany</i> , Vol. VII, plate VII.
250	Date-tree [to S. of Trappes Valley P.O.].	28. 9. 1813	3861—3868	
250—251	Blaauw Krantz [from Trappes Valley via P.O. Martindale].	29. 9. 1813	3874—3878	C.G. 3873 <i>Zamia horrida</i> (Kaffir bread). Ic. 651/2.
251—252	Robbers' Station	30. 9. 1813	3879—3895	While here, 24 of his oxen were stolen.

252—253	Lombard's	1. 10. 1813	3896—3903	Note inversion of Herb. Nos.
253—254	At head of Kasouga River	2. 10. 1813	3904—3913	
	Sutherland's Post [near Kasouga Rd.]	3. 10. 1813	3953—3979/2	
	Rietfontein	5. 10. 1813	3914—3952	
	In walk from Riet Fontein to Kowie R.	9. 10. 1813	3980—4036	
255	At Rietfontein	11. 10. 1813	4037—4054	C.G. 4059 <i>Cissus</i> . Ic. 677. C.G. 4076 <i>Anthericum</i> Ic.
	From Rietfontein southward (along the valley) towards the seashore.	14. 10. 1813	4055—4135	
255—256	At Rietfontein	19. 10. 1813	4126—4127	Burchell here crossed into the district of Uitenhage.
256—257	Lombard's (same as 253)	25. 10. 1813	4128—4155	
257	Assagay Bosch [East of Sidbury]	26. 10. 1813	4156—4170	
257—258	At Assagay Bosch	27. 10. 1813	4171—4177	
	Rautenbach's Drift	28. 10. 1813	4178—4199	
	In a walk from Drift upwards along the Bushman River.	2. 11. 1813	4200—4206	
258—259	Addo Drift	4. 11. 1813	4207—4216	
260	Zand Fontein.	7. 11. 1813	4217—4221	
261	In the bushes on the eastern side of the town.	13. 11. 1813	4222—4236	
	In a woody glen, northwards from the town.	1. 12. 1813	4237—4274	
261—262	Algoa Bay	4. 12. 1813	4275—4288	
	On the sand hills near Fort Frederick [Port Elizabeth] close to the shore.	6. 12. 1813	4289—4300	
262	Near the Burying-ground	11. 12. 1813	4301—4323	
	Near the Blockhouse	13. 12. 1813	4324—4346	
	By the Brekens River	14. 12. 1813	4347—4363	
	At Algoa Bay	17. 12. 1813	4364—4367	
	Algoa Bay	18. 12. 1813	4368—4378/15	C.G. 4378/5—4378/15 = Fuci.
262—263	Reef Cape [at Knoetze's on the coast]	24. 12. 1813	4379—4398	
263—264	Bethelsdorp	25. 12. 1813	4399	
	Uitenhage	27. 12. 1813	4399/2—4399/3	C.G. 4399/3 <i>Cyrtanthus uniflorus</i> .
	At Uitenhage	1. 1. 1814	4400—4405	
	On Road between Uitenhage and Chalybeate Spring.	4. 1. 1814	4406—4413	
	At Uitenhage	6. 1. 1814	4414—4417	
			4418—4422	

<i>Map Ref.</i>	<i>Place.</i>	<i>Date.</i>	<i>Herb. Nos.</i>	<i>Remarks.</i>
264	In walk under the Mts. on western side of Zwartkops River; and along its banks.	12. 1. 1814	4423-4438	
	At Uitenhage	15. 1. 1814	4439-4442	
264-265	Drostyd Farm	21. 1. 1814	4443-4448	
265-266	Lead-mine	26. 1. 1814	4449-4471	
	By side of the Rivulet	27. 1. 1814	4472-4482	
266	At the Lead-mine	28. 1. 1814	4483-4497	
	In the grassy Plain near Mine	29. 1. 1814	4498-4510/2	
	Krakakamma—near the farm house	30. 1. 1814	4511-4512	
267	By the rivulet	31. 1. 1814	4513-4527	
	In a wood, on the hills on northern side of the Lake.	1. 2. 1814	4528-4537	
	Near the farm house	2. 2. 1814	4538-4540	
267-268	Between the lake and upper part of Lead-mine River.	3. 2. 1814	4541-4562	C.G. 4547 same as 3590 Limodorum Ic. 645.
	Upper part of the River	5. 2. 1814	4563-4573	
269	Halfway to van Staaden R.	7. 2. 1814	4574-4605	
270	At the Drift of van Staaden's River	7. 2. 1814	4606-4625	
	In the Forest at the Drift	7. 2. 1814	4626-4650	
		8. 2. 1814	4651-4658	
		9. 2. 1814	4659-4667/2	
270-271	Galgabosch [Thornhill]	10. 2. 1814	4668-4670	
		11. 2. 1815	4671-4682	
	On the Berg—south-west side nearest to Galgebosch.	14. 2. 1814	4683-4756	
272	Loerie River	17. 2. 1814		
271-273	Melk River [vicinity of Hankey]	17. 2. 1814	4757-4789	
273-274	Gamtoos River	18. 2. 1814	4790-4802	

While in this area, Burchell experienced some hindrance and trouble about which he wrote to Mr. J. C. Bergh, Secretary at George. Because of this difficulty he named his Station No. 275, Inhospitable Station.

Sheet 9A.—From Gantoos River to Misgund. Divisions of Humansdorp and Uniondale.

Map Ref.	Place.	Date.	Herb. Nos.	Remarks.
274—275	Inhospitable Station; by side of rivulet [near Kruisfontein Mt.]	21. 2. 1814	4803—4807	Burchell groups all his collections from 1st to 7th March, 1814, under one heading.
276	At Suku [Sea-cow R.] [tributary of Kromme R. near Billson].	22. 2. 1814	4808—4809	
		27. 2. 1814	4810—4820	
276—277 and 277—280	Essenbosch	1. 3. 1814	4821—4837	At Majoor'skraal, Burchell crossed to the south side of Kromme R.
278	Piet van Beulan's [Majoor'skraal] ..			
279	Cornelis Vermaak's [near Assegai Bosch P.O.]	2. 3. 1814		At Jagersbosch, he crossed and kept to the north side of Kromme River; his route was similar to that of the modern railway line.
280	Hermanus Pietersen's [Jagersbosch]			
	Wagenboom Station [near Kompagnie's Drift]	3. 3. 1814		Burchell remarks that at Kompagnie's Drift he enters a new district—George Heights, a short distance west of the Drift, is on the boundary of the Humansdorp and Uniondale divisions.
281	In a walk to a woody kloof on northern side of Kromme River near to Wagenboom Station.	7. 3. 1814	4838—4884	
281—282	At Wagenboom Station	9. 3. 1814	4885	The rivers he now crosses flow to the north and are tributaries to the Couga River.
	Wagenboom River Station [near Joubertina].	10. 3. 1814	4886—4895	
	On the rocky side of the Mt. close on the western bank of Wagenboom River, on the northern side of Lange Kloof.	11. 3. 1814	4896—4937	
282—283	Anagallis Station at Rademeyer's [near P.O. Lauterwater].	12. 3. 1814	4938—4944	
283—284	At Anagallis	13. 3. 1814	4945—4950	
	V.C. Ignace Ferreira's in Lange Kloof [near Misgund].	13. 3. 1814	4951—4966	

Sheet 9b.—From Misgund to Gouritz River.		Divisions of Uniondale, George, Knysna, Mossel Bay.		Remarks.
Map Ref.	Place.	Date.	Herb. Nos.	
285	Jan Heinz's [near Redclyffe Hotel]	14. 3. 1814		
284—286	Groote Rivier in Lange Kloof [upper reaches of Couga R.].	14. 3. 1814	4967—4976	
286	At Groote Rivier [W. side of Harlem—near Anhalt].	14. 3. 1814	4977—5028	
287	Michael Hinz's [near Siesta]	16. 3. 1814		Burchell went some distance west of Avontuur before turning south-eastward to descend towards Plettenberg Bay.
286—288	Between Groote R. and Avontuur—Matthys Zondag's.	17. 3. 1814	5029—5037	
289	Martinus van Staade's [n. side of Kraantzberg].	18. 3. 1814		
288—290	Backhuysen [near Mikes] at Groote R. in Lange Kloof [Groote R. is Keurbooms R.].	18. 3. 1814	5038—5066	
290	In the rocky Kloof: about the source of the Keurbooms River.	19. 3. 1814	5067, 5068	
291	In the Mts. close to Hans Backhuysen's house and along the rivulet on the Keurbooms R. [near Forest Reserve].	20. 3. 1814	5069—5082	
		22. 3. 1814	5083—5098	In Burchell's map the name Keurbooms R. is, in several cases, given to what is now named the Kruis River. It is not until he reaches Paardekop that his portrayal of rivers becomes more definite. It would appear that he skirted the Forest Reserve. He shows Scheurberg, which may be interpreted as Kruis Rivier Spitskop. Not until Kruisvallei—division of Knysna—did he join the road that leads from Prince Alfred's Pass to Plettenberg Bay.
	Along the Nuakamma (a ravine rivulet on the S.W. side of the Keurbooms R.). [near Forest Reserve].	23. 3. 1814	5099—5110	
292				
293	On the banks of the Rivulet at Roman's Kraal near Keurbooms.	24. 3. 1814	5111—5122	
292—293	Nuakamma River—Roman's Kraal [near Dubbel Berg].	24. 3. 1814	5123—5133	

Map Ref.	Place.	Date.	Herb. Nos.	Remarks.
294	Mantis Station [near Diep R. N. of Kruis Vallei P.O.].	25. 3. 1814	5134—5144	
295	In the deep woody ravine by the shaded streamlet at Cloete's Kraal [N. of Vallei P.O.].	26. 3. 1814	5145—5150	C.G. 5148 Baea. Ic. 682.
295—296	Paarde Kraal [north side of Paarde Kop].	26. 3. 1814	5151—5167	In the Forest region of Knysna, Burchell spent some time, but not as long as he wished.
296	At Paarde Kraal	27. 3. 1814	5168—5182	
	On Paardeberg	27. 3. 1814	5183—5197	His copious notes regarding the trees he observed are to be found in the <i>Ephemera</i> , <i>Memoranda Botanica</i> MS. I.
	In the forest and by the rivulet at Kaatje's Kraal [N. side of Krantz-bosch Forest Station].	30. 3. 1814	5198—5213	
		31. 3. 1814	5214—5225	His Algae, Lichens, Musei, Fungi and Fuci were handed over by him to the experts Agardh, Arnott, Hooker and Dawson Turner.
297	On the edge of the Forest...	1. 4. 1814	5226—5251	
	In a walk to Hartbeest Viakte [Wyandskraal].	3. 4. 1814	5252—5268	
	In the Forest	5. 4. 1814	5269—5273	
	In the Forest	8. 4. 1814	5274—5279	
297—298	Van der Waits [E. of Kafferkop]	9. 4. 1814	5280, 5281	
	In the Forest [W. of Kafferkop]	10. 4. 1814	5282—5295	
298—299	Deep River [Bitou River—W. of Witte drift].	12. 4. 1814	5296—5305	
300	In Plettenberg Bay near the Landing-place on the Sand Hills.	14. 4. 1814	5306—5323	
	On the "Baak" (Baaken) hill and on the hills near that spot.	17. 4. 1814	5324—5345	
	On the seashore, close to the Landing-place.	21. 4. 1814	5346—5347	
301	The Poort—Garden of Eden [W. of Harkerville].	22. 4. 1814		
300—302	Melkthout Kraal	24. 4. 1814	5348—5379	
302	At Melkthout Kraal in a walk from the House to the mouth of the Knysna.	29. 4. 1814	5380—5385	
		1. 5. 1814	5386—5390	

<i>Map Ref.</i>	<i>Place.</i>	<i>Date.</i>	<i>Herb. Nos.</i>	<i>Remarks.</i>
	In the Forest close to Melkhout Kraal, by the quarry	6. 5. 1814	5391—5431	
	In the same part of the forest as on 6th, but deeper—along the Kloof.	10. 5. 1814	5432—5440	
	At the entrance to same part as on 6th	11. 5. 1814	5441—5446	
	In the forest, close by the house ..	{ 31. 5. 1814	5447	
		{ 7. 6. 1814	5448	
		8. 6. 1814	5449—5465	
302	On the hills near to and southward of Melkhout Kraal.	20. 6. 1814	5466—5483	C.G. 5465 <i>Sorghum</i> , "guinea grass" from Rex's garden.
	Along the road, by a small wood below the garden at Melkhout Kraal.	23. 6. 1814	5484—5487	
	From the hills near the house : (brought by Speelman).			
	In a walk towards the cornland (i.e. towards the shore).	26. 6. 1814	5488—5493	
	About Melkhout Kraal ..	29. 6. 1814	5494—5507	
	In an excursion to the mouth of the Knysna.	3. 7. 1814	5508—5518	
	Brought by Hendrick from "Houtbosch,"	11. 7. 1814	5519—5520	
	At Knysna Drift—left bank ..	12. 7. 1814	5521—5522	
303	At Zand Kraal on western side of Knysna River near the Drift.	13. 7. 1814	5523—5538	
	In the forest at Zand Kraal and also at the forest by Knysna Hoek.	20. 7. 1814	5539—5542	
302	At Melkhout Kraal ..	25. 7. 1814	5543—5547	
		31. 7. 1814	5548	
	Brought from "Houtbosch" ..	2. 8. 1814	5549, 5550	
302—303	Between Melkhout Kraal and the Knysna Drift.	5. 8. 1814	5551—5554	
303—304	Gowkamma Station ..	6. 8. 1814	5555, 5567	
		7. 8. 1814	5568—5604	

There is no direct evidence that he was a guest in George Rex's home, but he certainly visited the garden often, for several *Cat. Geog.* Nos. have "from Rex's Garden" against them.

304—305	Greene Valleij (Green Vlei) [near Ruigrevlei P.O.]. At western end of Greene Valleij . . On the Sand hills southward from the station and at western end of Greene Valleij.	8. 8. 1814 9. 8. 1814 12. 8. 1814	5605—5623 5624—5646 5647—5667	
305—306 306—307	Zwartee Valleij [E. end of Swart Vlei] Station near Lange Valleij [N.W. end of Swart Vlei].	12. 8. 1814 13. 8. 1814	5668—5684/5 5685—5696	C.G. 5684/4 5684/5 Fuci.
308	Near the Station (at La Harpe's, near Lange Vlei). On a rocky hill by the spring above La Harpe's house. In the plain (about 4½ miles from La Harpe's) on road to Trakadakow.	14. 8. 1814 18. 8. 1814 18. 8. 1814	5697—5700 5701—5711 5711/2	
309	Trakadakow Station [near Romeo Valleij P.O.]. By the rivulet; on the edge of forest and also in the forest. Near where waggons stood (not in the Forest). In the Forest at Trakadakow Station	20. 8. 1814 21. 8. 1814 22. 8. 1814 24. 8. 1814 26. 8. 1814 28. 8. 1814	5712—5729 5730—5754 5755—5764 5765—5784 5785—5806 5807—5813	C.G. 5711/2 <i>Thamnochortus giganteus</i> . Burchell here turned north and joined what is now the main road from Woodville to George.
309—310	Western side of Kaaiman's Gat [Woodville]. In the wood by the side of the road ascending the right (or western) bank of Kaaimansgat.			
311	By the side of a Rivulet in the Forest at Sylvan Station [north side of George]. At Sylvan Station	30. 8. 1814 2. 9. 1814 5. 9. 1814 8. 9. 1814 11. 9. 1814 12. 9. 1814 15. 9. 1814	5814—5815 5816—5834 5835—5843 5844—5891 5892—5922 5923—5992 5993—6008	Sketch No. 700 shows Burchell's wagons at the foot of the Postberg. He has marked his track up the mountain.
	On Postberg near George. In ascent up the eastern ridge. Postberg. In descent down western ridge. At Sylvan Station			

<i>Map Ref.</i>	<i>Place.</i>	<i>Date.</i>	<i>Herb. Nos.</i>	<i>Remarks.</i>
	On lower part of Postberg (eastern ridge).	20. 9. 1814	6009—6032	In a letter to Rev. F. Hesse, Cape Town, Burchell wrote on 22nd Sept., 1814, that he was surprised that so little was known scientifically of the nature of the forests in this part of the Colony.
	In a walk from Sylvan Station to Drostyd.	23. 9. 1814	6033 6035	
	At Sylvan Station close to spot where wagons stood.	25. 9. 1814	6036—6042	
	In the forest at Sylvan Station ..	29. 9. 1814	6043 6054	
311	On the plain round the Station ..	29. 9. 1814	6056—6067	
	On the plain	4. 10. 1814	6068—6069	
	In the forest near the Station ..	4. 10. 1814	6070—6084	
311—312	Nowsakamma River [Witte Els Rivier].	6. 10. 1814	6085 6100	From George, Burchell went to Mossel Bay along what is now the main road.
312—313	At the Drift—Witte Els R. ..	7. 10. 1814	6101—6148	
	Great Brak River (western side of drift).	8. 10. 1814	6149 6157	
313—314	Little Brak R.	9. 10. 1814	6158 6170	
	Eastern bank of Little Brak R. (near Philip Coetzee's).	10. 10. 1814	6171 6197	
314—315	Hartenbosch	12. 10. 1814	6198—6218	
315—316	Mossel Bay	13. 10. 1814	6219 6220	
	On shrubby sand, near landing-place just above high water mark, on the sea shore near the Post-House.	18. 10. 1814	6231 6251/2	
	In a walk to the Schulp-gat (shell cave) at Cape St. Blaize and in return over the hills to station at Landing-place.	19. 10. 1814	6252 6257	
	On the rocky and sandy hills northward from and near to the Landing-place.	23. 10. 1814	6258 6283	
	At the Landing-place	26. 10. 1814	6284—6303	
316	Along road between Mossel Bay and Zoute Rivier [S. of Bartlesfontein].	28. 10. 1814	6304—6318	
317		1. 11. 1814	6319—6339	Cytinus—Phelypea Ic. 707.

<i>Map Ref.</i>	<i>Place.</i>	<i>Date.</i>	<i>Herb. Nos.</i>	<i>Remarks.</i>
318	Kleinberg.			
317—319	Rivulet in map Duyker R. [W. of Kleinberg].	2.11.1814	6340—6372	From this rivulet, Burchell went north-west to the Gouritz R. in the Middledrift area.
319—320	Gouritz River	3.11.1814	6373—6405	
320	Mostly on the dry hills on the eastern side of Gouritz R.	5.11.1814	6406—6436	
	In the dry channel of an arm of the Gouritz R.	6.11.1814	6457—6503	

Sheet 10.—From Gouritz River to Stormvlei. Divisions of Riversdale, Swellendam.

<i>Map Ref.</i>	<i>Place.</i>	<i>Date.</i>	<i>Herb. Nos.</i>	<i>Remarks.</i>
321	Hells Hoogte	7.11.1814		
320—322	Groote Valsche Rivier [N. of W. from Gouritz].	8.11.1814 9.11.1814	6504—6527 6528—6558	
322—323	Zoetmelks Rivier [N.W. of Kaffirkuils Rivier Mt.].	10.11.1814	6559—6605	
323	Zoetmelks Rivier	11—15.11.1814	6606—6620	
	In a walk to the white-clay Pit (or Cliff) bearing true North-east from the Station.	17.11.1814	6621—6738	C.G. 6704 Euphorbia Ic. 715.
	Along the road a mile westward	20.11.1814	6739—6753	
	On the hills north-westward	21.11.1814	6754—6804	
	Zoetmelks R.	23.11.1814	6805—6813	
324	Kaffir Kuils R.	24.11.1814		
323—325	Kleine Vette R.	25.11.1814	6814—6854	
326 } 327 }	Halting Places	26.11.1814		

<i>Map Ref.</i>	<i>Place.</i>	<i>Date.</i>	<i>Herb. Nos.</i>	<i>Remarks.</i>
325-328	On the road (over the mountain) from our station at Kleine Vette R. to our station at the foot of the Great Southern Range at Mountain Station.	27.11.1814	6855-6927	27th Nov., 1814. The wording "over the mountains" is rather misleading. Burchell shows on his field sheet that from Zoetmelks R. he travelled practically due west and not by the recognised path which hugged the foot of the mountains and led to Plattekloof at Gysmanshoek. My interpretation of the situation of his stations is that he went from Kaffirs Kuils R. to a station on the Groot Vet R. to the north of the present town of Riversdale (325). He continued from there due westward to Klein Vet R. (327) (there was an intermediate station 326 shown on his field sheet). From 327, which I calculate would be somewhere in the vicinity of the present-day railway station of Van Wyk, he went due north over the Kleinbergen to his station "at the foot of the Great Southern Range"—Mountain Station No. 328.
328	On the lower part, and on the southern side of the Great Southern Range at Mt. Station at "Valley River's Poort."	1.12.1814	6928-6963	A sketch, No. 717, shows his "ascent of the Great Mt. on 11th Dec." Some day I hope, with the help of this sketch and his notes, to fix the exact site of his Mountain Station.
	About the Waterfall at Valley River's Poort at Mt. Station.	2.12.1814	6964-6997	
	On the mountains at "Valley River's Poort" just above the Waterfall at Mountain Station (<i>in locis saxosis</i>).	3.12.1814	6998-7016	"Valley River's Poort" may be interpreted as the defile leading to the Pass at Plattkloof, but this will not be clear until the exact site of his Mountain Station is fixed.
	Close to our station near "Valley River" Waterfall at Mt. Station.	5.12.1814	7017-7025	

At Mt. Station (at the foot of the mountains; also, above the Waterfall, and on the eastern side of it).	6.12.1814	7062—7040	This station has been identified from sketch No. 718.
At the Waterfall at Mt. Station in "Valley River's Poort."	8.12.1814	7051—7054	
In the ascent of (and near the summit of) the great Mountain at Mt. Station.	9.12.1814	7055—7102	
On the summit of the Great Mountain on the eastern side of "Valley River's Poort" at Mt. Station, some in descent.	10.12.1814	7103—7133	
By the Rivulet (Valley River) to our station at Mt. Station.	13.12.1814	7134—7137	
In a walk from Mt. Station to Lombard's (W. of van Wyk's).	14.12.1814	7138—7155	
At Mountain Station (close to the station).	19.12.1814	7156—7160	
Jacob du Plessis's [farm Corrente-rivier, 12 miles N.W. of Riversdale].	19.12.1814		
329—330 Krombek's Rivier	21.12.1814	7161—7193	
331 Jonkers Fontein			
330—332 Cuckoo Station of Jonkers Rivier	22.12.1814	7194—7196	C.G. 7242 <i>Hemitelia capensis</i> , Ic. 719, published in <i>The Journal of S.A. Botany</i> , Vol. VII, Oct. 1941. <i>Mem. Bot. MS. I Eph.</i> , p. 52.
332 On the dry hills near Cuckoo Station	24.12.1814	7197—7208	
332—333 Cornelis Britz's place on Duivenhoks Rivier (near Platte Kloof).	25.12.1814	7209—7213	
333—334 Eastern end of Grootevaders Bosch	26.12.1814	7214—7217	
Close to the station on eastern side of Grootevaders Bosch.	27.12.1814	7218 7224	
334 In the Forest at Grootevaders Bosch northward from the station.	29.12.1814	7225—7255	
334—335 Schieman's Fall	31.12.1814	7256	
335—336 Zuurbrak or Moses' Kraal	1. 1.1815	7257—7263	
At the Brak. In the Buffelsjagts Rivier.	3. 1.1815	7264	
336—337 Buffelsjagts Rivier Drift	4. 1.1815	7265—7277	
On left bank of R. at the Drift	5. 1.1815	7278—7289	
337—338 Swellendam	6. 1.1815	7290—7295	

Map Ref.	Place.	Date.	Herb. Nos.	Remarks.
338	In the ascent of the Craggy Peak in the Great Range at Swellendam.	14. 1. 1815	7296—7327	A sketch shows his station was near the Drostdy. He remained at Swellendam "to make drawings, astronomical observations and to ascend the mountains."
	On the summit of the Craggy Peak	15. 1. 1815	7328—7370	
	On the summit and in the descent from the Craggy Peak.	16. 1. 1815	7371—7428	
	At the station at the Foot of the Mt. near the village.	21. 1. 1815	7428—7435	
	On the hills, about the village ..	22. 1. 1815	7436—7440	He travelled S.W. to the Breede River after leaving Swellendam, and after crossing the River north of Bromberg he followed the usual road, then in use, to Stormvlei.
338—339	At the upper Ford: Breede River	25. 1. 1815	7441—7453	
	On the eastern bank at the Upper Ford (<i>in callibus aridis</i>).	26. 1. 1815	7454—7488	
339—340	Hottentots Fig Station on River Zondereinde [west of confluence with Breede R.].	26. 1. 1815	7489—7495	
	On the right bank of the R. Zondereinde.	27. 1. 1815	7496—7525	
340—341	Stormvlei From Hottentot Fig Station through Hessaquas Kloof to Storm Valley.	28. 1. 1815	7526—7534	

Map Ref.	Place.	Date.	Herb. Nos.	Remarks.
Sheet 1.—	From Stormsvlei to Cape Town.			Divisions of Swellendam, Caledon, Somerset West, Stellenbosch, Cape.
342	At Eksteen's on Zondereinde R. about 5 miles westward from Storm Valley.	29. 1. 1815	7535—7548	The return journey from Stormsvlei to Cape Town is recorded by Burchell on his sheet 1.
343	On a stony hill close to station at Ganze Kraal on the Slang R. on the northern side of Z.E. River. (<i>in callibus petrosis</i> .)	12. 2. 1815	7549—7565	
343—344	Through Zoetemelks Valley and Hootmakers R. to Genadendal	13. 2. 1815	7566—7593	

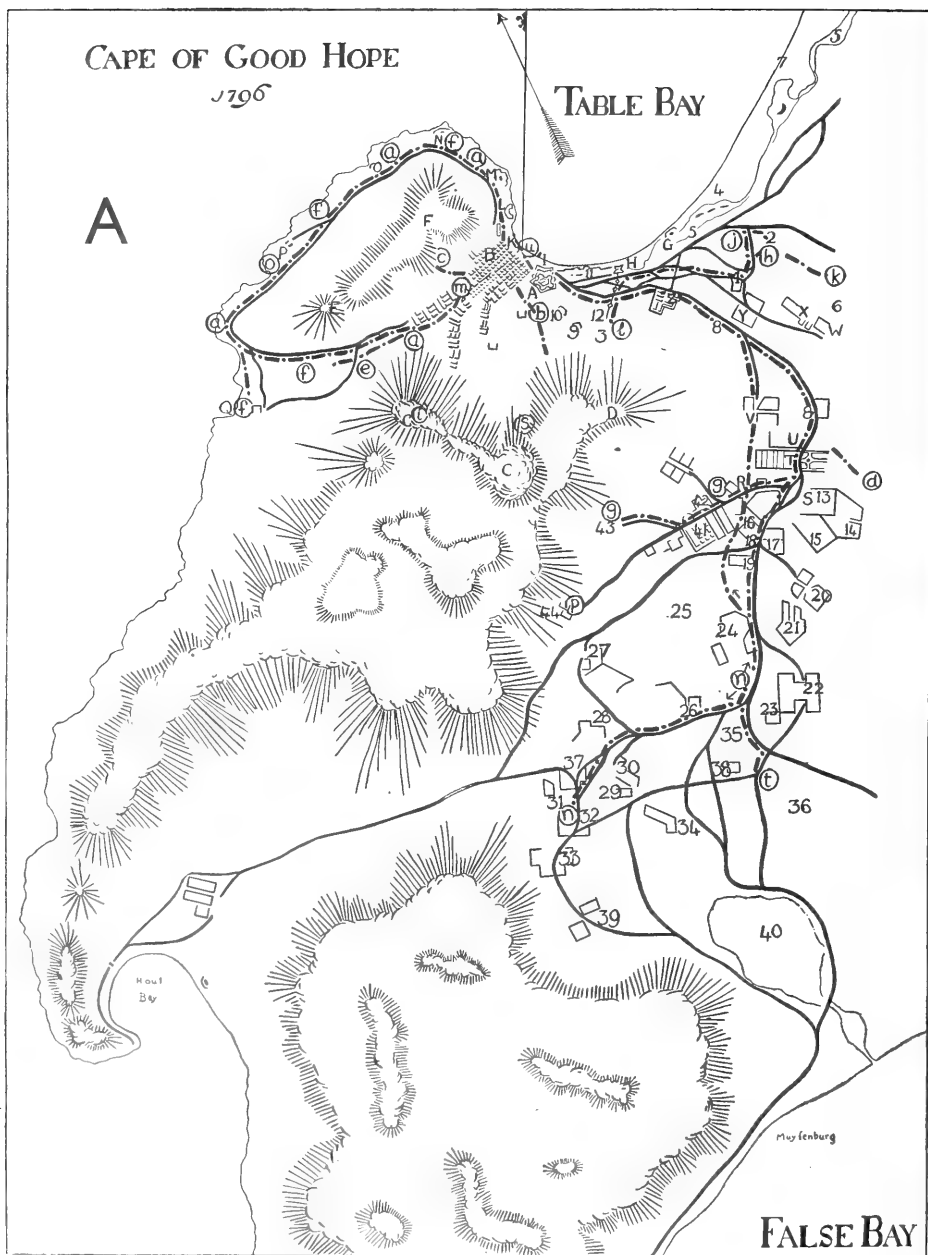
344	In the ascent up the great Mt. of Baviaans Kloof at Genadendal. On the summit and the uppermost of Great Mt.	15. 2. 1815	7594—7673	
	In the descent from the Mt. ... On the northern (or Bosjesveld) side of the great mts.: excepting those marked L.M. (<i>latere Australi</i> of the same Mt.	16. 2. 1815	7674—7774	
	N.B.—For L.M. put L.A.)	17. 2. 1815	7775—7809	
	At Genadendal, close to station in the Kloof.	27. 2. 1815	7810—7905	
344	Station about 9 miles west of Genadendal [Donkershoek].	1. 3. 1815	7906—7912	
345	On Donkerhoek-berg ...	7. 3. 1815	7913—7931	
346	On Donkerhoek-berg—northern side towards Piet du Toit's.	9. 3. 1815	7938—7988	
347	In the Bosjesveld Mts. on road from Donkerhoek to Rooftwood Station (near Stephanus le Roux's).	10. 3. 1815	7989—8006	
346—348	In Bosjesveld on road to Nieuwekloof [Viljoen's Pass].	10. 3. 1815	8007—8011	
	On the mts. of Nieuwekloof ...	11. 3. 1815	8012—8026	
349	On the road through the Nieuwe Kloof (as far as Chaleides Station).	16. 3. 1815	8027—8076	
		18. 3. 1815	8077—8119	
		20. 3. 1815	8120—8158	
349—350	Palmiet River Station [Elgin] ...	21. 3. 1815	8159—8170	
350—351	At Steenbras R. eastern side of Hottentot-Holland Kloof [Sir Lowry's Pass].	22. 3. 1815	8171—8187	
	On the mts. (northern side of Kloof at source of the Steenbras R.).	25. 3. 1815	8188—8235	

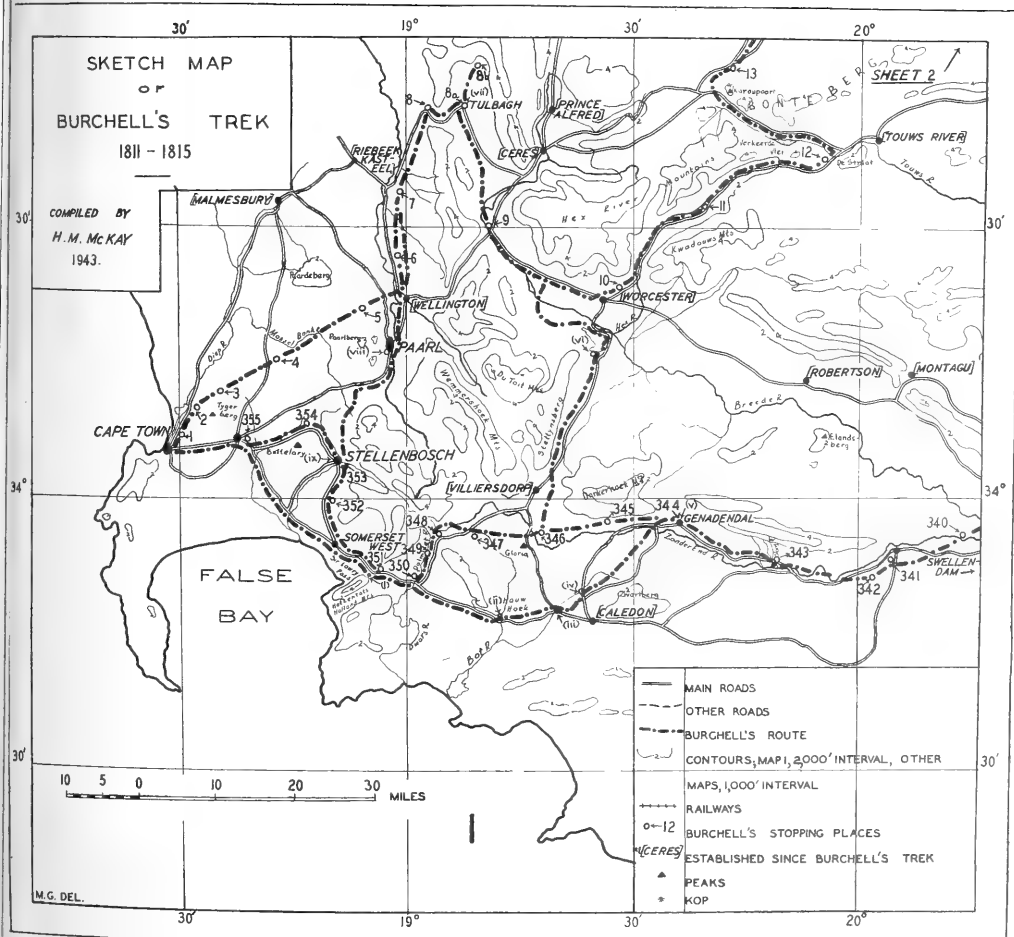
Station 345 appears on map sheet, but has no information given about it.

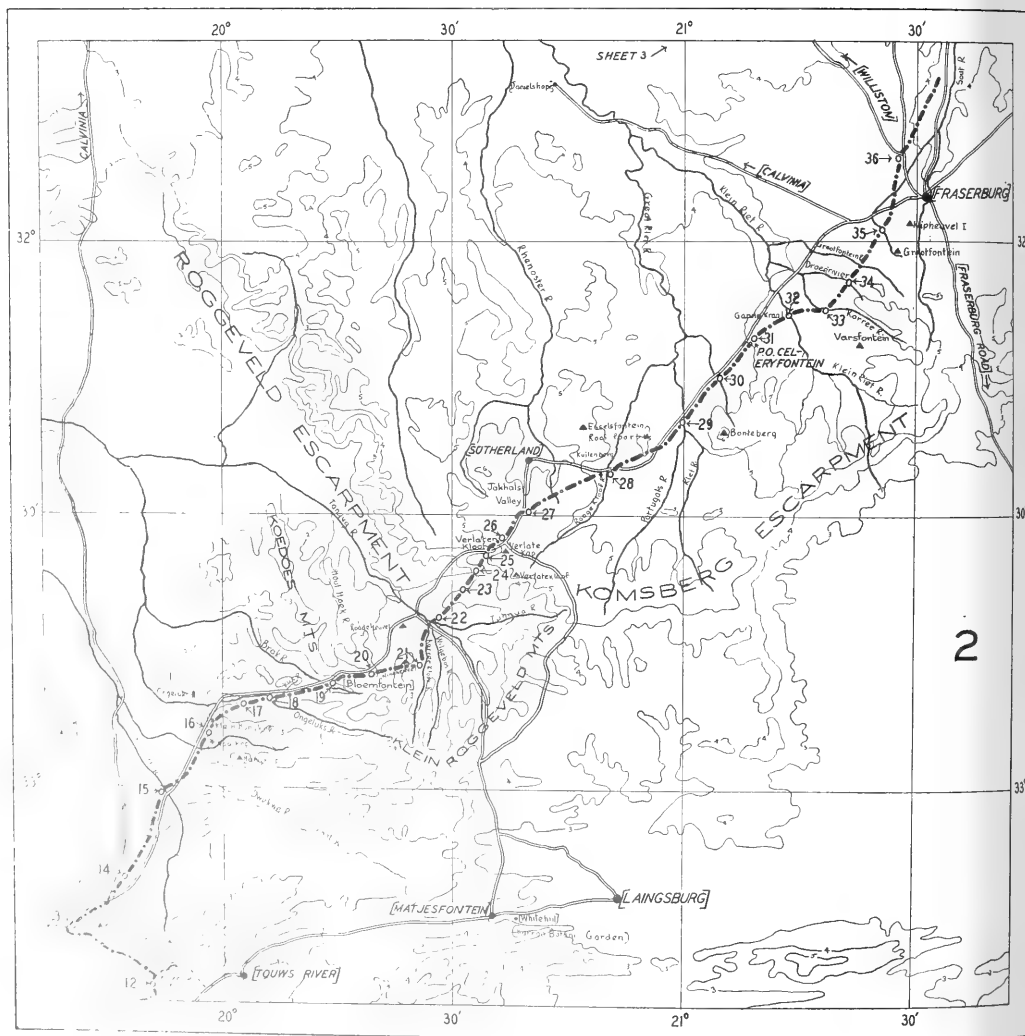
From Nieuwe Kloof, Burchell wrote Hesse asking him and Pölemann to come to meet the traveller at Hottentot Hollands Kloof.
 "Look out for two waggons covered with mats only and stationed by the Steenberg [Steenbras] river amongst the bushes at some distance out of the great road and perhaps on the north side of it." Nieuwe Kloof, 18th March, 1815.

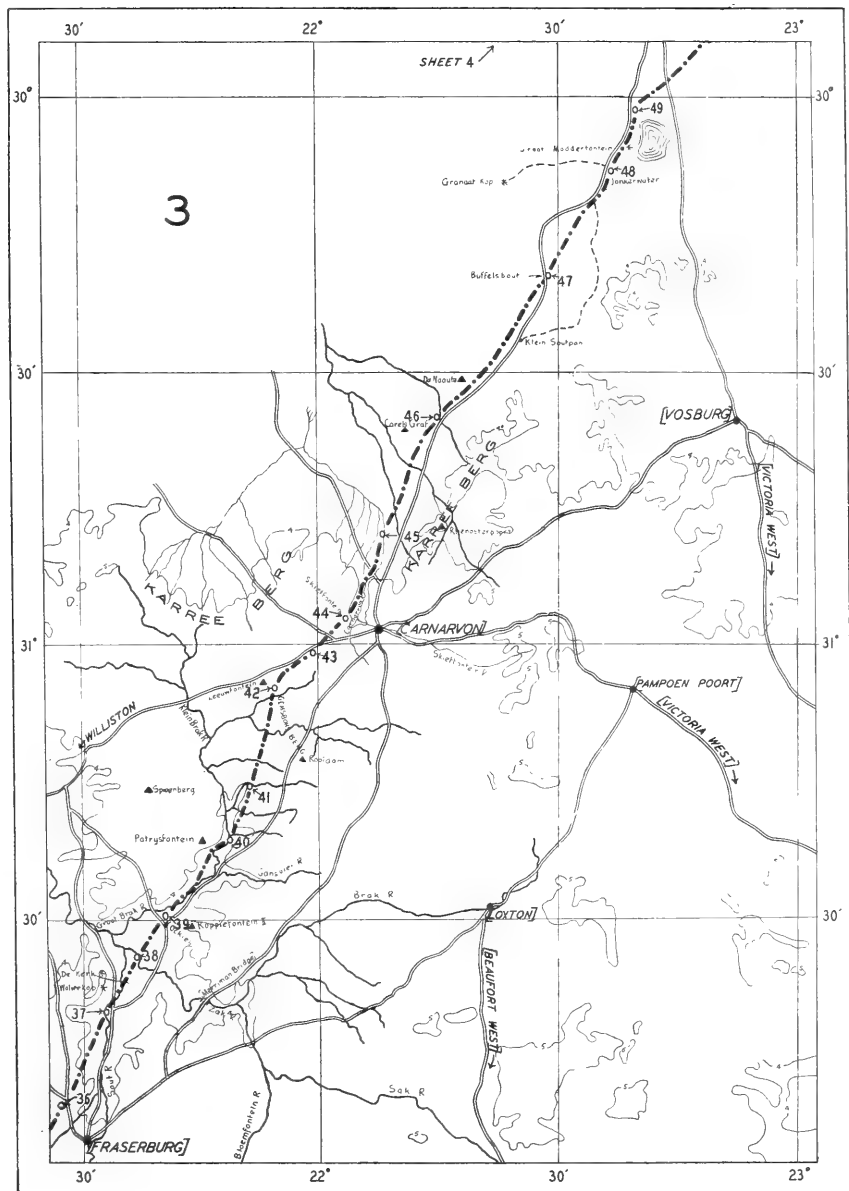
<i>Map Ref.</i>	<i>Place.</i>	<i>Date.</i>	<i>Herb. Nos.</i>	<i>Remarks.</i>
	In the Kloof (by the roadside) . . .	29. 3. 1815	8236-8276	
	At the Station about a mile west from the Turnpike at foot of Kloof.	30. 3. 1815	8277-8296	
351	Jonkers Valley	30. 3. 1815	8297-8333	
352	Stellenbosch	1. 4. 1815	8334-8337	
353	Storm's Grave [Bottellary Hill] . .	6. 4. 1815	8338-8343	
354	Luygaard's Fontein (in Cape Downs) [Bellville]	12. 4. 1815	8344-8375	
355	Salt River	13. 4. 1815	8376-8395	
<i>Sheet A.—CAPE TOWN AND CAPE PENINSULA IN 1815.</i>				
<i>Map Ref.</i>	<i>Place.</i>	<i>Date.</i>	<i>Herb. Nos.</i>	<i>Remarks.</i>
(m)	In Govt. Garden in Cape Town (at the foot of the oaks).	25. 4. 1815	8396	
	Found in the vicinity of Cape Town	12. 6. 1815	8397-8408	" . . . were brought to me and were perhaps found growing on Table Mt. or in the vicinity of Cape Town". <i>Cat. Geog.</i>
	On the lower part of Table Mt. (above the Watmill).	16. 6. 1815	8409-8411	
(r)	On the northern end of Lion Mt. (on Lion's Rump).	18. 6. 1815	8412-8440	
(s)	On Devil's Mt. (ascending up the Kloof which divides it from Table Mt.).	20. 6. 1815	8441-8454/2	
(t)	About midway between Cape Town and Simon's Bay, near the "Half-way House", and in a walk thence towards the Steenberg Mts. in the vicinity of Witteboom and Constantia.	25. 7. 1815	8455-8515	
	On the beach in Table Bay (between the Jetty (at Castle) and Green Point).		8516-8593	
(u)	From a garden (Mr. Hesse's) in Cape Town.	1. 8. 1815	8594-8613/3	C.G. 8613/4 <i>Oxalis monophylla</i> , was collected in "Leeuwe Straat".
		1. 8. 1815	8733-8737	The numbers from 8614 to 8732 belong to the first visit to Genadendal and Tulbagh, and have been designated there.

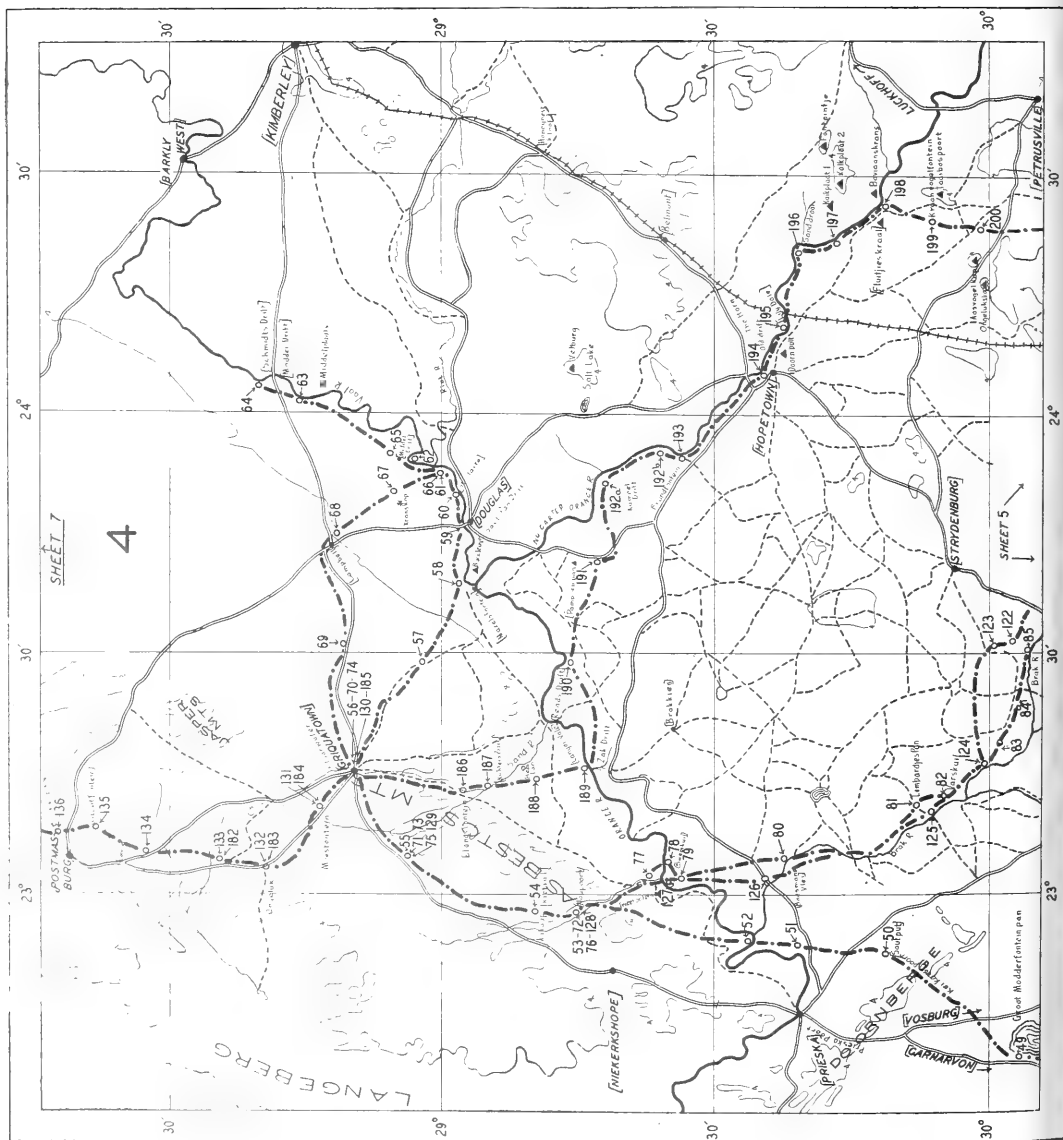


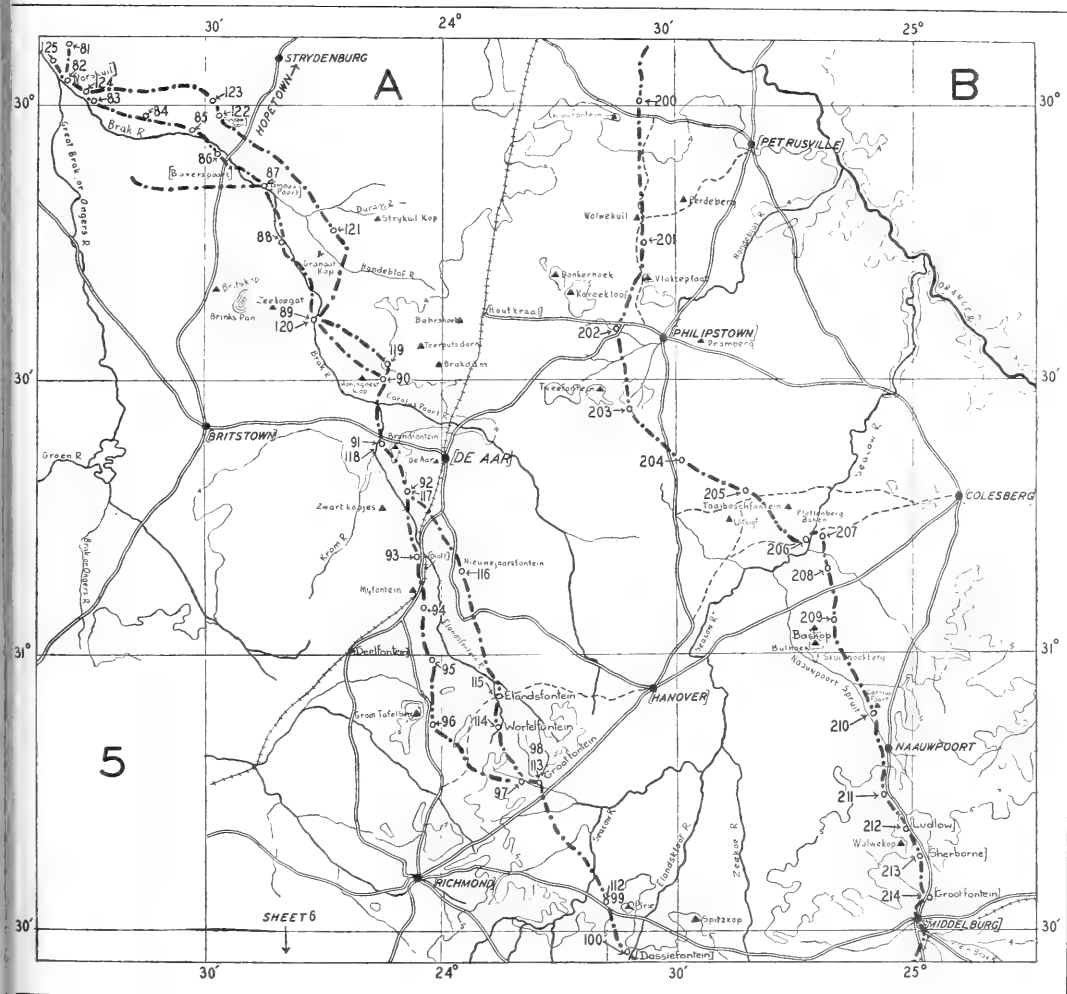


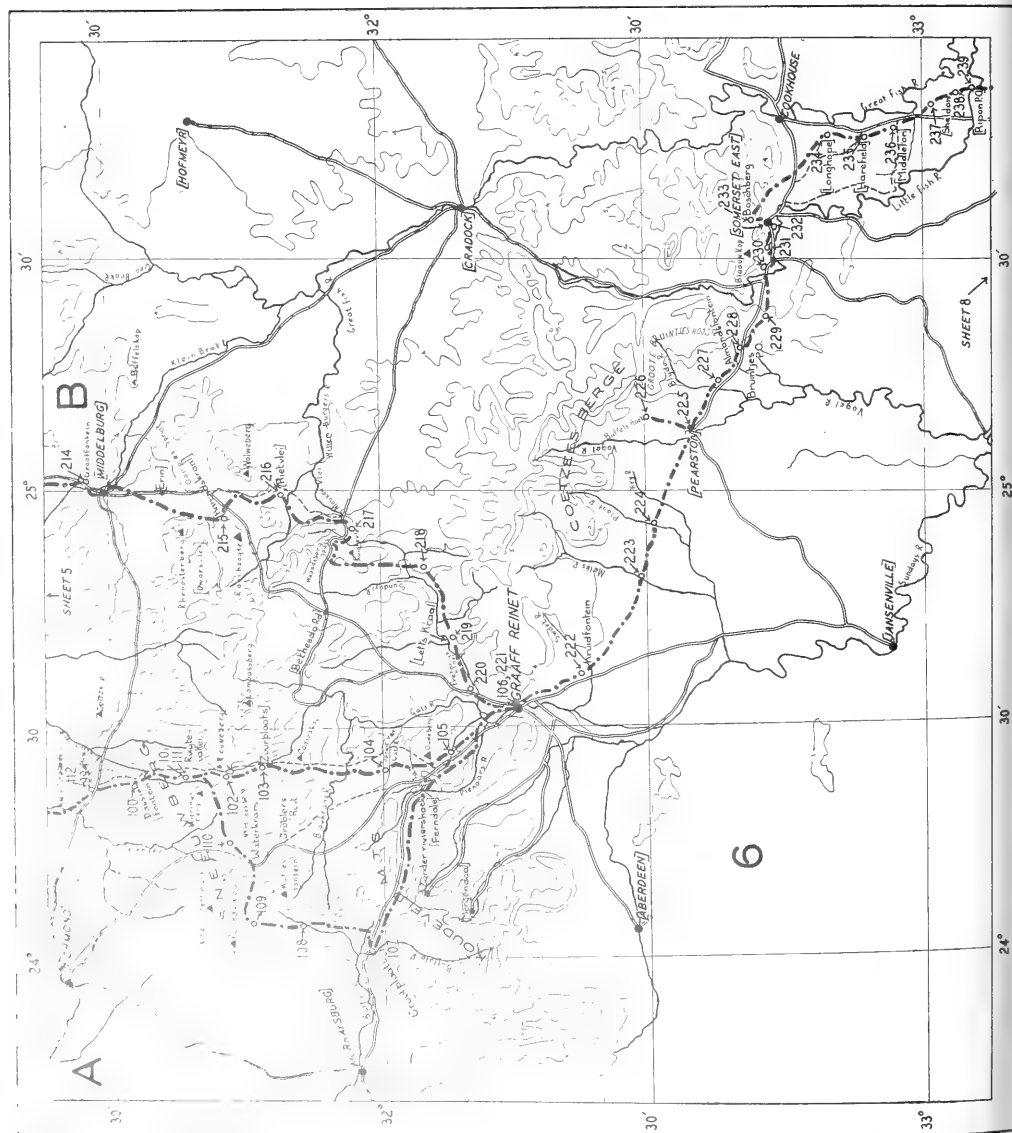


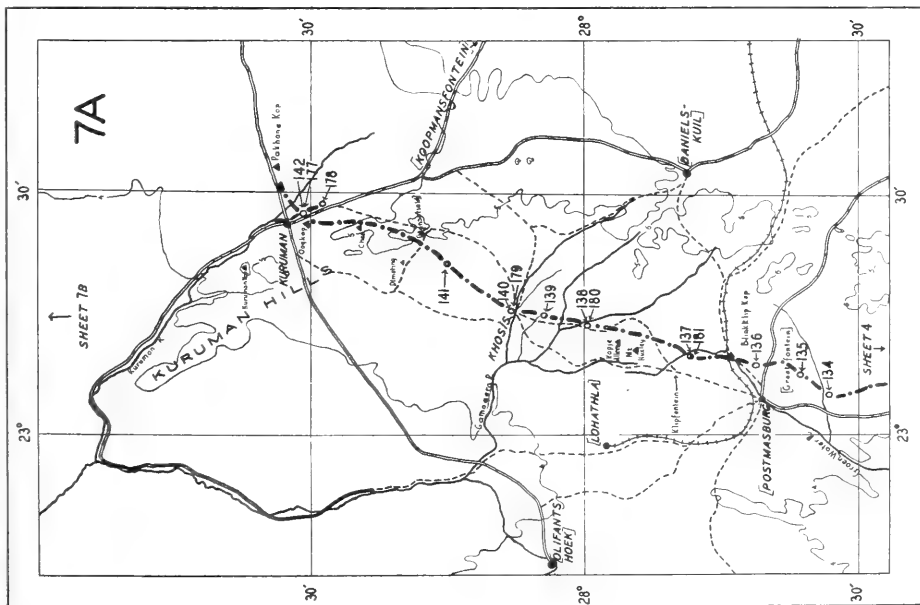
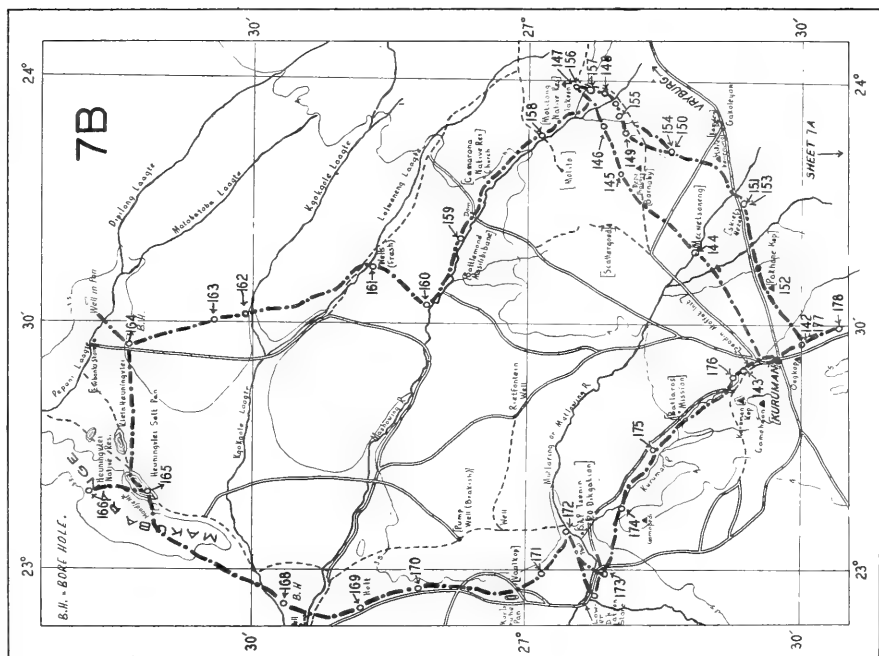


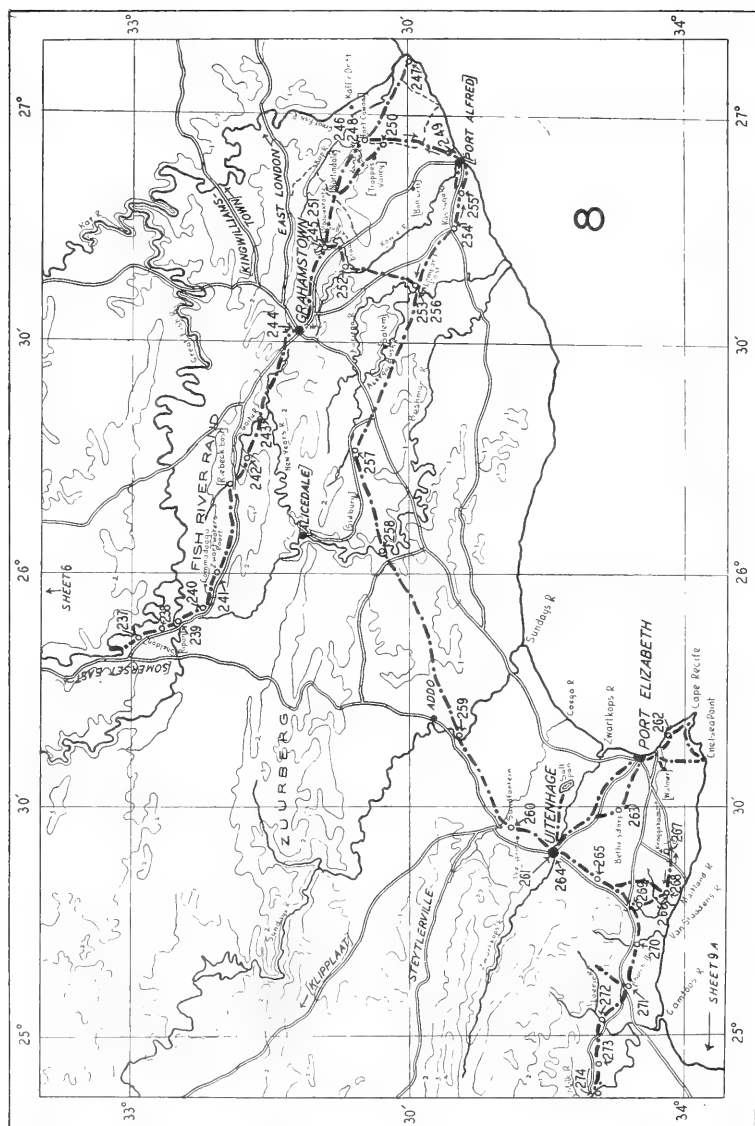


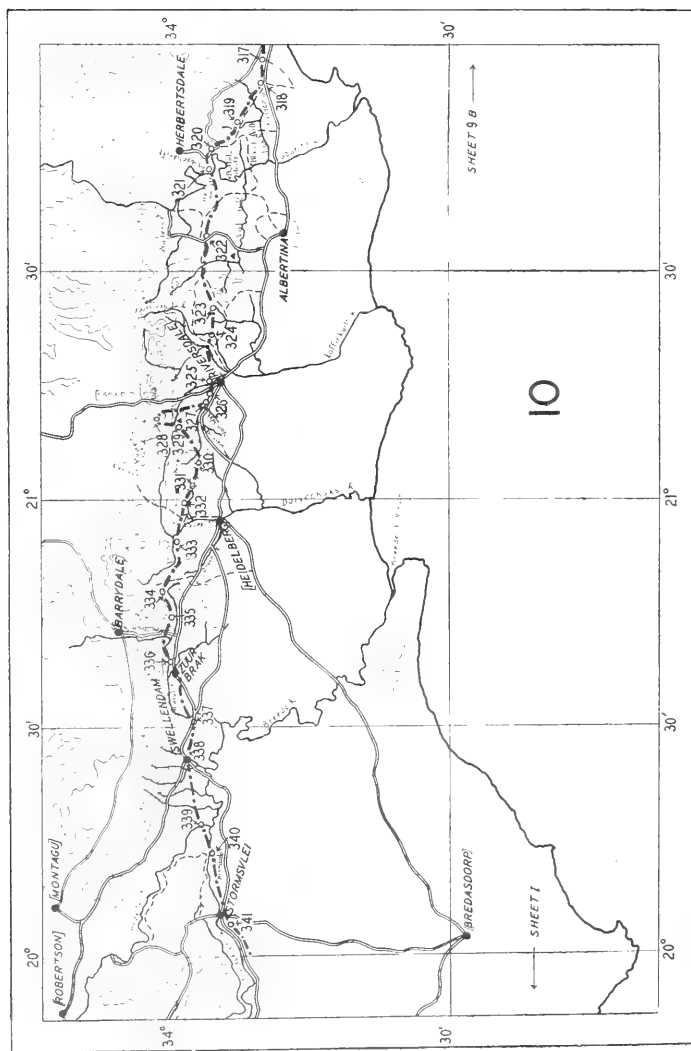












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NOTES ON SOUTH AFRICAN MARINE
ALGAE. II.¹

By GEORGE F. PAPENFUSS.

CHLOROPHYCEAE.

Cladophora radiosa (Suhr) Kützing, Sp. alg. : 422, 1849. *Conferva radiosa* Suhr, Flora, 17 : 741, 1834. *Cladophora catenifera* Kützing, Sp. alg. : 390, 1849 ; Tab. phyc., 3 : 24, pl. 83, fig. 1, 1853.

An examination of one of the original specimens of *Conferva radiosa* Suhr (1834) from Algoa Bay (in Mus. Botan. Stockholm) has shown that this little-known species is identical with the plant that was described by Kützing in 1849 and figured in 1853 as *Cladophora catenifera*. The type of *C. catenifera* was sent to Kützing by Harvey under the name *Conferva pellucida*. The writer has not had the opportunity of examining this specimen but has seen a duplicate (in Mus. Botan. Stockholm) that was sent to Areschoug by Harvey under the same name. Areschoug's specimen agrees well with Kützing's (1853) figure of *Cladophora catenifera* and with the specimen of *Conferva radiosa* referred to above.

Barton (Journ. Bot. 1896, p. 193) has pointed out that *Conferva radiosa* Suhr and *Cladophora catenifera* Kütz. are co-specific but she adopted the specific name *catenifera*. The epithet *radiosa* has priority, however. Kützing made the combination *Cladophora radiosa* without apparently having seen the species.

Cladophora rugulosa Martens, Die Tange : 112, pl. 2, fig. 3, 1866. *Apjohnia rugulosa* (Mart.) G. Murray, Trans. Linn. Soc. London, Ser. 2, Bot., 3 : 209, pl. 52, fig. 5, 1891.

¹ The first paper in this series appeared in Botaniska Notiser, 1940, pp. 200—226. The work was assisted by a grant from the Carnegie Corporation of New York through the University of Cape Town.

Several authors (Krauss, Flora 1846, p. 215 ; Areschoug, Phyc. Cap. 1851, p. 12 ; Levring, Lunds Univ. Arsskr. N.F., Avd. 2, 34(9), 1938, p. 11) have referred plants of this species to *Cladophora prolifera*, but a comparison of the South African plant with material of *C. prolifera* (in Herb. Agardh) from the Adriatic has shown that the two species are not identical. In *C. rugulosa* the cells are considerably longer, the annular constrictions in the cells more pronounced, the main axes more prominent, and the whorls of short and long branches more obvious.

The writer has not had the opportunity of examining the type of *C. rugulosa*, but since only one species of *Cladophora* having annular constrictions in the cells occurs in South Africa there need be no doubt regarding the identity of *C. rugulosa*. Martens received his specimen from Krauss, who had listed (Krauss, l.c.) and distributed the plant under the name *Conferva prolifera*. Martens does not cite the record of Krauss, but the writer has seen six of Krauss' specimens (one in Herb. Inst. Allg. Bot. Hamburg, two in Herb. Agardh, and three in Herb. Areschoug in Mus. Botan. Stockholm) and found all of them to be *C. rugulosa*.

It is to be noted that Martens referred to *C. rugulosa* specimens from South Africa (Port Natal) and Japan (Yokohama), without specifying the type locality. From his account it is obvious, however, that Martens had assigned the name *Cladophora rugulosa* in manuscript form to the plant from Port Natal prior to the receipt of the material from Japan. This circumstance and the fact that Port Natal is the first locality cited by Martens indicate that South Africa should be regarded as the type locality of *C. rugulosa*.

An examination of a specimen (in Mus. Botan. Stockholm) of the plant that Drège (Zwei. Pfl. Dok, 1843, pp. 157, 174) listed under the name *Conferva trichotoma* has shown it to be *Cladophora rugulosa*. Areschoug (Phyc. Cap. 1851, p. 13) and Barton (Journ. Bot. 1893, p. 55) accepted Drège's record of *Cladophora trichotoma*.

Bryopsis setacea Hering, Ann. and Mag. Nat. Hist., 8 : 91, 1841 ; Krauss, Flora, 29 : 214, 1846 ; Barton, Journ. Bot., 33 : 161, pl. 349, figs. 3, 4, 1895 ; *Ibid.*, 34 : 458, 1896. *Bryopsis myosuroides* Kützing, Tab. phyc., 6 : 27, pl. 77, fig. 1, 1856 ; Levring, Lunds Univ. Arsskr., N.F., Avd. 2, 34(9) : 13, fig. 6E—G, pl. 3, fig. 6, 1938.

As has been pointed out by Barton (Journ. Bot. 1895, p. 161 ; 1896, p. 458), *Bryopsis myosuroides* Kützing (1856) is synonymous with *B. setacea* Hering (1841). The writer has been fortunate in being able to examine an original specimen of *B. setacea* (in Herb. Inst. allg. Bot. Hamburg) which was collected by Krauss at Port Natal Point, the type locality. The specimen is accompanied by a pencil figure marked

"*Bryopsis setacea* Hering," and its label contains the following inscription in Krauss' writing: "*Bryopsis Balbisiana* Ag., Port Natal Point, Juni 1839, N. 13."

Since Krauss (1846) records but one species of *Bryopsis*, *B. setacea* Hering, from South Africa (Port Natal Point) and since Hering founded this species on material collected by Krauss at Port Natal Point, it may be taken as certain that the plant that Krauss had named *B. Balbisiana* in his herbarium actually represents *B. setacea* Hering.

The writer has not yet had the opportunity of examining the type of *B. myosuroides* Kützing, the source of which likewise is Port Natal, but the specimen of *B. setacea* referred to above agrees well with Kützing's figures of *B. myosuroides*. The plant is common along the east coast of South Africa. Barton (Journ. Bot., 1895, p. 161) has designated as lectotype of *B. setacea* the specimen, Krauss No. 322, which is preserved in the British Museum.

Caulerpa scalpelliformis (R. Br.) C. Ag. var. ***denticulata*** (Decsne) Web. v. Bosse, Monogr. d. Caulerpes: 287, pl. 22, fig. 11c-d, pl. 23, figs. 8, 10, 1898. *Caulerpa denticulata* Decaisne, Pl. de l'Arabie: 120, pl. 6, fig. B, 1841.

This plant is here recorded for the first time from South Africa. It was secured at St. Lucia Rocks in St. Lucia Bay. The South African material agrees well with what probably is one of Decaisne's original specimens of this variety that is preserved in Herb. Agardh (No. 16439).

C. scalpelliformis var. *denticulata* was also represented by several specimens in a small collection of marine algae from Delagoa Bay (collected by Moe in 1903) that the writer received for determination from Mus. Botan. Stockholm.

Caulerpa tongaensis nom. nov. *Caulerpa filiformis* Harv. ex J. Agardh, Till alg. syst., 1: 5, 1872 (not *C. filiformis* (Suhr) Hering, 1841) *Caulerpa Van Bosseae* Papenfuss, Bot. Not., 1940: 203, 1940 (not *C. Vanbosseae* Setchell et Gardner, Proc. Calif. Acad. Sc., Ser. 4, 12(29): 704, 1924).

The renaming of this species is necessitated by the fact that the binomial *Caulerpa Van Bosseae* Papenfuss (1940) is invalidated by *C. Vanbosseae* Setchell et Gardner (1924). The species is known from the Friendly Islands only. The type specimen is No. 16347 in Herb. Agardh.

Udotea orientalis A. et E. S. Gepp, Codiaceae of the Siboga Exped.: 119, 1911.

As far as is known South Africa contains but one species of *Udotea*. This plant has been referred to *U. Desfontainii* (Barton, Journ. Bot. 1896, p. 193, as *U. Desfontainesii*) and to *U. conglutinata* (Delf and Michell, Ann. Bolus Herb. 1922, p. 95; Levring, Lunds Univ. Arsskr.

N.F., Avd. 2. 34(9), 1938, p. 14) but A. and E. S. Gepp (1911) have pointed out that it is *U. orientalis*.

PHAEOPHYCEAE.

Padina plumbea (Aresch.) Levring, Kungl. Fysiogr. Sällskap. Lund Förhandl., 10(20): 10, fig. 5, 1940. *Zonaria plumbea* Areschoug, Phyc. Cap.: 25, 1851. *Chlanidophora plumbea* (Aresch.) Papenfuss, Bot. Not., 1940: 204, fig. 5, 1940.

This species was placed in the genus *Chlanidophora* by Papenfuss (1940) but Levring (1940) has shown that it should be referred to *Padina*.

Up to the present the species has been known only from Areschoug's type material. The plant was recently rediscovered, however, at Port Edward, on the Natal coast, by Professor T. A. Stephenson and his co-workers. Unfortunately this material is sterile, and it is not possible to compare the distribution of the reproductive organs on the thallus in *P. plumbea* with that of other distromatic species of *Padina*.

Dictyopteris delicatula. Lamouroux, Nouv. Bull. Sc. Soc. Philom., 1: 332, pl. 6, fig. 2b, 1809.

This species was reported from South Africa (Natal Bay) by Areschoug (Phyc. Cap. 1851, p. 27). De Toni (Syll. Alg. 1895, p. 253) questions Areschoug's record, but an examination of the latter's specimens has shown that they are *Dictyopteris delicatula*. The writer has also collected the plant along the Natal coast.

Carpomitra filiformis (Suhr) comb. nov. *Chytraphora filiformis* Suhr, Flora, 17: 721, pl. 1, fig. 1, 1834. *Carpomitra Chytraphora* Kützinger, Tab. phyc., 9: 37, p. 89, fig. II, 1859.

It is necessary to restore the name under which this species was first described by Suhr (1834). The generic name *Chytraphora* Suhr (1834) antedates *Carpomitra* Kützinger (1843), but the retention of the latter as a *nomen conservandum* has been sanctioned by the International Botanical Congress.

Desmarestia firma (Ag.) Skottsberg, Wissensch. Ergebn. schwed. Südpolar-Expd., 4(6): 21, 1907. *Sporochnus herbaceus* var. *firma* Agardh, Syst. alg.: 261, 1824 (in part). *Desmarestia ligulata* var. *firma* J. Agardh, Sp. alg., 1: 169, 1848. *Desmarestia herbacea* f. *laticor* Kützinger, Tab. phyc., 9: 42, pl. 100, 1859.

Considerable confusion exists regarding the identity of the common South African *Desmarestia*. When describing *Sporochnus herbaceus* var. *firma*, C. Agardh (1824) listed specimens from both France and South Africa. J. Agardh (1848), however, assigned only South African plants to this variety. Since the European specimens credited to var. *firma*

by C. Agardh probably were representative of *Desmarestia ligulata*, the varietal name *firma* may be considered as applying to the South African plant; and the specimen (No. 49916 in Herb. Agardh) that was sent to C. Agardh by Delaland may be regarded as the type.

In 1907 Skottsberg raised var. *firma* to specific rank but in a later paper he (K. Sv. Vet.-Akad. Handl. 61(11), 1921, p. 21) reduced it to a synonym of *Desmarestia ligulata*. The writer has no first-hand knowledge of the Antarctic species of *Desmarestia*, on which Skottsberg based his judgment, but the South African plant under consideration is considerably broader and longer than the North Atlantic *D. ligulata*. According to Turner (Fuci 1809, pl. 98) and Harvey (Phyc. Brit. 1846, pl. 115), *D. ligulata* may grow to a length of 2—6 ft. The writer has obtained specimens of *D. firma* that were over 10 ft. long and $4\frac{1}{2}$ ins. wide at the broadest parts.

D. firma seems to be closely related to *D. herbacea*, from the Pacific coast of North America, but since the two plants occur in widely separated regions it seems best to retain them as distinct species.

Desmarestia aculeata (L.) Lamour. This species was reported from South Africa by Barton (Journ. Bot. 1893, p. 111). The specimen upon which the record is based is in Herb. Mus. Brit. and at one time was in Herb. Shuttleworth. It is labelled in the hand of Harvey "*Hypnea spicigera* C.B.S.—W.H.H.," and an accompanying notation in Mr. A. Gepp's writing reads "Probably label exchanged in Hb. Shuttleworth."

The specimen actually is *Desmarestia aculeata* but the writer concurs with the opinion of Mr. Gepp that an exchange of labels had occurred. It is unlikely that Harvey would have mistaken *Hypnea spicigera*,² which is very common in South Africa, for *Desmarestia aculeata*. Accordingly, *D. aculeata* may safely be omitted from the flora of South Africa.

Colpomenia sinuosa (Roth) Derbès et Solier, in Castagne, Suppl. au cat. d. pl. qui croiss. nat. env. Marseille : 95, 1851. *Ulva sinuosa* Roth, Cat. bot., 3 : 327, pl. 12, 1806.

An examination of the specimen (No. 14 in Exped. Novara collection in Herb. Naturhist. Mus. Vienna) upon which Grunow (Alg. Novara 1867, p. 49) founded his South African record of *Hydroclathrus clathratus* (as *Asperococcus clathratus*) has shown it to be *Colpomenia sinuosa*. Barton (Journ. Bot. 1893, p. 112) included Grunow's record in her list of South African algae, without, however, having seen his specimen.

Thus far *Hydroclathrus* is not known to occur in South Africa, although it may be expected to be present along the Natal coast.

² The species (as *Hypnea spicigera*) was illustrated by Harvey in his *Nereis australis* (pl. 49).

Hormophysa triquetra (L.) Kützinger, Phyc. gen. : 359, 1843. *Fucus triquetra* Linnaeus, Mant. plant., 2 : 312, 1771 ; Turner, Fuci, 1 : 72, pl. 34, 1808. *Cystoseira triquetra* (L.) C. Agardh, Sp. alg., 1(1) : 61, 1820 ; Syst. alg. : 284, 1824 ; J. Agardh, Sp. alg., 1 : 215, 1848 ; De Toni, Syll. alg., 3 : 176, 1895.

All reports of the occurrence of this species in South Africa are based upon Linnaeus' (1771) type specimen, which was collected by König in "Mari Capensi" during the latter's voyage to India. Since *Hormophysa triquetra* has not been collected again in South Africa, it seems likely that an exchange of labels had occurred and that König actually had obtained his specimen in India, where the species is known to occur. Accordingly, it is suggested that *H. triquetra* be excluded from the flora of South Africa.

Barton (Journ. Bot. 1893, p. 83) cites Bory as an additional authority for the presence of this plant in South Africa, but the latter author (in Duperrey, Voy. la Coquille, 1828, p. 132) merely states, "On l'a retrouvée, dit-on, au cap de Bonne-Espérance."

Cystoseira ericoides J. Ag. This species was reported from South Africa by Barton (Journ. Bot. 1893, p. 83). The specimen upon which the record is based is in Herb. Mus. Brit. It is labelled "*Halerica* Cap Agulhas, C. b. Sp." in a hand unknown to the writer and was identified by Barton as "*Cystoseira ericoides* J. Ag." In addition the label bears the inscription "R. F. Hohenacker" in what seems to be Barton's writing.

It is to be noted that this plant was not included in Hohenacker's *Algae marinae siccatae*. The specimen is a fragment (less than 2 cm. long) of a Phaeophyceean alga. It does not resemble any of the specimens of *Cystoseira ericoides* that are in Herb. Agardh nor any South African marine alga known to the writer. Accordingly, it seems best to exclude *C. ericoides* from the marine flora of South Africa.

RHODOPHYCEAE.

Helminthora divaricata (Ag.) J. Ag. This species was recorded from South Africa by Barton (Journ. Bot. 1893, p. 144). An examination of the specimen (in Herb. Mus. Brit.) upon which the record is founded has shown it to be a *Helminthora* ; and its habit suggests that it is *H. divaricata*. The specimen is marked as coming from "C. G. Hope," but the collector's name is not given. It is extremely doubtful, however, that South Africa was the source of the specimen, and in the writer's opinion *H. divaricata* should be excluded from the South African marine flora.

Callophyllis fastigiata (J. Ag.) J. Ag. This species was recorded from South Africa by Barton (Journ. Bot. 1893, p. 141). The specimen (in Herb. Mus. Brit.) upon which the record is based is marked as coming from "Cap Agulhas, C. b. Sp." and it is credited (with a query) to "R. F. Hohenacker."³ A comparison of the specimen with the type of *Callophyllis fastigiata* (No. 25004 in Herb. Agardh) has shown it to be this species.

It is to be noted that the bound sets of Hohenacker's *Algae marinae siccatae* did not contain South African plants of *C. fastigiata*. The specimen in question may have been included, however, as a loose sheet in one of the fascicles of the issue acquired by the British Museum. Since Hohenacker's exsiccata contained three numbers (223, 281, 337) of *C. fastigiata* from the Falkland Islands, the type locality of this species, it seems likely that an exchange of labels had occurred and that the specimen under consideration was obtained in the Falkland Islands. Accordingly, it is suggested that *C. fastigiata* be omitted from the flora of South Africa.

Eucheuma muricatum (Gmel.) Weber-van Bosse, Liste alg. Siboga, Rhodophyceae, 3 : 413, 1928. *Fucus muricatus* Gmelin, Hist. fuc. : 111, pl. 6, fig. 4, 1768. *Eucheuma spinosum* (L.) J. Agardh, Öfv. Kungl. Svenska Vetensk. Akad. Förhandl., 4 : 16, 1847 ; Sp. alg., 2(2) : 626, 1852 ; *Ibid.*, 3(1) : 601, 1876 ; Anal. alg. : 122, 1892 ; De Toni, Syll. alg., 4(1) : 369, 1897. *Fucus spinosus* Linnaeus, Mant. plant., 2 : 313, 1771 ; Turner, Fuci, 1 : 36, pl. 18, 1808.

All records of the occurrence of this plant in South Africa are based upon the specimen that constitutes the type of Linnaeus' *Fucus spinosus*. Since *Eucheuma muricatum* has not been collected in South Africa again, it seems probable that an exchange of labels had occurred and that Linnaeus' specimen came from elsewhere.⁴ Accordingly, it is suggested that *E. muricatum* be excluded from the flora of South Africa. J. Agardh

³ The locality name "Cap Agulhas" suggests that this specimen (as well as the one referred to under *Cystoseira ericoides*) at one time may have been in the possession of Hohenacker, who included a number of algae from Cape Agulhas in his *Algae marinae siccatae*. The writer has not been able to ascertain who collected Hohenacker's algae from Cape Agulhas, but it seems likely that it may have been someone connected with the Moravian Mission Station at Elim, which is situated not far from Cape Agulhas. In addition to Hohenacker the only other early collector of marine algae who had material from Cape Agulhas seems to have been Krauss (Flora 1846, p. 214), who listed one species, *Caulerpa filiformis*, from this locality. This record was also given by Hering (Ann. Mag. Nat. Hist. 8, 1841, p. 91), who reported on some of Krauss' algae.

⁴ J. Agardh (Sp. Alg. 1852, p. 627) has seen specimens of *E. muricatum* that were collected by König and suggests that Linnaeus' type may have come from the same source. Should this be true the place of origin of the specimen may have been India, where König is known to have collected for Linnaeus.

as early as 1852 questioned South Africa as the source of Linnaeus' specimen. Barton (Journ. Bot. 1893, p. 173) referred to a specimen of *E. muricatum* that had been collected by McMillan in False Bay but later (l.c. 1896, p. 198) pointed out that the record was based on a misidentification.

Hypnea spicifera (Suhr) Harvey, *apud* J. Agardh, Öfv. Kungl. Svenska Vetensk.-Akad. Förhandl., 4: 14, 1847; Ner. austr.: pl. 49, 1847 (as *Hypnea spicigera*). *Gracilaria spicifera* Suhr, Flora, 17: 731, pl. 2, fig. 14 m—o, 1834. *Hypnea armata* (Ag.) J. Agardh, Sp. alg., 2(2): 444, 1852; De Toni, Syll. alg., 4(2): 474, 1900. *Sphaerococcus musciformis armatus* C. Agardh, Sp. alg., 1(2): 328, 1822.

An examination of the original material of *Hypnea armata* (Ag.) J. Ag. (Nos. 33665 and 33666 in Herb. Agardh) has shown that this species is synonymous with *H. spicifera*. The specimens that Barton (Journ. Bot. 1893, p. 173) listed under *H. armata* have not yet been examined.

Caulacanthus divaricatus (Suhr) comb. nov. *Laurencia divaricata* Suhr, Flora, 23: 265, 1840; Kützing, Sp. alg.: 858, 1849 (not *Laurencia divaricata* J. Agardh, Sp. alg. 1863, p. 754).

An examination of one of the original specimens (No. 34144 in Herb. Agardh) of the plant that Suhr (1840) described under the name *Laurencia divaricata* has shown it to be the South African plant that passes under the name *Caulacanthus ustulatus*. The identity of *Laurencia divaricata* Suhr has been obscure since the species was founded. Kützing (1849), without having seen the plant, referred it to "*species perobscurae*", while J. Agardh (1863, p. 770) placed it in "*species exclusae*", pointing out that it was a species of *Caulacanthus*. J. Agardh did not make the transfer, however, and in a later treatment (J. Agardh, l.c. 1876) of *Laurencia* and *Caulacanthus* made no reference to *Laurencia divaricata* Suhr. De Toni (Syll. Alg. 1903, p. 808) followed J. Agardh in referring the plant to "*species exclusae*", while Barton (Journ. Bot. 1893, p. 174), without having seen Suhr's material, included the species in her list of South African algae. The specimens referred to *Caulacanthus ustulatus* by Barton (l.c. 1893, p. 173; 1896, p. 198) and Drège (Zwei Pfl. Dok. 1843, pp. 111, 223, as *Sphaerococcus ustulatus*) have not been examined by the writer but they probably belong to *C. divaricatus*, while those listed under *Rhodomela botryocarpa* by Delf and Michell (Ann. Bolus Herb. 1922, p. 114) are *C. divaricatus*.

In habit, *Caulacanthus divaricatus* resembles both the European *C. ustulatus* and the New Zealandian *C. spinellus*. The writer has, however, seen only dried material of the two latter species and was thus not able to make a critical comparison. Future study may prove

these three plants to be co-specific, but for the present it seems best to retain them as separate species. If *C. divaricatus* and *C. spinellus* should prove to be identical but distinct from *C. ustulatus*, the binomial *C. divaricatus* will have priority, since *Laurencia divaricata* Suhr (1840) antedates *Rhodomela ? spinella* Hooker and Harvey (Lond. J. Bot. 1845, p. 534).

In connection with the binomial *Laurencia divaricata* Suhr, it may be pointed out that this name invalidates *L. divaricata* J. Agardh (Sp. Alg. 1863, p. 754). The latter species has been reduced, however, to a variety of *L. obtusa* by Yamada (Univ. Calif. Publ. Bot. 16(7), 1931, p. 223).

Gracilaria Protea J. Agardh, Sp. alg., 3(4) : 58, 1901. This species is here recorded for the first time from South Africa. Plants collected by the writer at various localities along the Natal coast agree well with J. Agardh's type material of *G. Protea* from Mauritius.

A comparison of the material which Delf and Michell (Ann. Bolus Herb. 1922, p. 108) recorded under the name *Gracilaria dentata* (in Herb. Tyson at Univ. of Cape Town) with the type material of *G. dentata* has shown that the plant in question does not belong to this species but to *G. Protea*.

Mychodea filiformis Kützinger, Tab. phyc., 17 : 24, pl. 82, figs. c, d, 1867.

This species was reported from South Africa by Barton (Journ. Bot. 1893, p. 141) under the name "*? Euhymenia filiformis*." The specimen upon which the record is based is in Herb. Mus. Brit. It is labelled "*Euhymenia filiformis* Kg. in litter. nov. sp. Caput bonae Sp. Wenek." in a hand unknown to the writer, and a notation in Barton's writing reads : "*Mychodea filiformis* Kütz. ? Cape of Good Hope. See Kützinger Tab. Phyc. XVII. 82."

In habit and in structure the specimen agrees well with Kützinger's figures of *Mychodea filiformis* and it may be assumed that Barton's record of *Euhymenia filiformis* actually does apply to *Mychodea filiformis*. The binomial *Euhymenia filiformis* probably was a manuscript name given by Kützinger, but to the writer's knowledge it was not used in a published description.

The specimen under consideration is tetrasporic, having serially divided sporangia which are dispersed in the outer cortex. The inner tissue of the thallus is composed of branched filaments and indicates that the thallus is constructed according to the fountain type of apical growth. These features suggest that the plant probably is representative of one of the following genera : *Agardhiella*, *Solieria*, or *Sarconema*

(cf. Kylin, Lunds Univ. Arsskr. N.F., Avd. 2. 28(8), 1932, pp. 16, 17, 21, for a characterization of these genera).

Since *Mychodea filiformis* has not been found in South Africa again and since the type locality of the species is Antigua, it seems likely that the specimen in question was credited to South Africa in error, and it is suggested, accordingly, that *M. filiformis* be excluded from the flora of South Africa.

Gymnogongrus glomeratus J. Agardh, Öfv. Kungl. Svenska Vetensk.-Akad. Förhandl., 6: 88, 1849; Sp. alg., 2(1): 322, 1851 (excl. syn. *Chondrus capensis* Kütz.). *Gymnogongrus corymbosus* J. Agardh, Öfv. Kungl. Svenska Vetensk.-Akad. Förhandl., 6: 88, 1849; Sp. alg., 2(1): 321, 1851.

An examination of the types of *Gymnogongrus corymbosus* J. Ag. and *G. glomeratus* J. Ag. (Nos. 24203 and 24204, respectively, in Herb. Agardh) has shown that these species are synonymous, the former representing merely a more divided state of the latter. Since these two names were first employed by J. Agardh (1849) in the same publication and since the plant is comparatively well known in South Africa as *Gymnogongrus glomeratus*, it is proposed to retain this name in preference to *G. corymbosus*.

Gymnogongrus complicatus (Kütz.) comb. nov.; *Chondrus* ? *complicatus* Kützing, Sp. alg.: 737, 1849; Tab. phyc., 17: 17, pl. 58, figs. a—d, 1867. *Halymenia furcellata* var. *capensis* C. Agardh, Sp. alg., 1(2): 214, 1822; Syst. alg.: 244, 1824. *Gymnogongrus capensis* (Ag.) J. Agardh, Sp. alg., 2(1): 324, 1851; *Ibid.*, 3(1): 213, 1876.

This plant is commonly known as *Gymnogongrus capensis*, but the specific epithet *complicatus* has priority and must supplant the former name. The writer has not had the opportunity of examining the type of *Chondrus* ? *complicatus* but Kützing's figure of the habit of the species leaves no doubt as to its identity. The plant is very common in certain parts of South Africa.

Gigartina scabiosa (Kütz.) comb. nov. *Chondrus scabiosus* Kützing, Tab. phyc., 17: 19, pl. 63, figs. a, b, 1867. *Gigartina fastigiata* J. Agardh, Öfv. Kungl. Svenska Vetensk.-Akad. Förhandl., 6: 86, 1849; Sp. alg., 2(1): 276, 1851 (excl. syn. *Chondrus scutellatus* Hering); *Ibid.*, 3(1): 193, 1876 (not *Gigartina fastigiata* Postels et Ruprecht, Illust. Alg. 1840). *Gigartina Chondrus* Areschoug, Phyc. Extra-europ. exsicc.: No. 13, 1850 (*nomen nudum*).

This species was first described by J. Agardh in 1849 under the name *Gigartina fastigiata* but this binomial is invalidated by *Gigartina fastigiata* Postels et Ruprecht (1840). Accordingly, it is necessary to employ the specific name under which the plant was described and

figured by Kützing (1867) as *Chondrus scabiosus*. The name *Gigartina Chondrus* under which the species was distributed by Areschoug (1850) is a *nomen nudum* while *Sphaerococcus (Chondrus) scutellatus* Hering (Ann. Mag. Nat. Hist. 8, 1841, p. 91), which has been regarded as synonymous with *Gigartina fastigiata* J. Ag., applies to a species of *Dicarella*, viz., *D. scutellata* (Her.) Papenfuss (Bot. Not. 1840, p. 219).

Halosaccion ramentaceum (L.) J. Ag. This species was recorded from South Africa by Barton (Journ. Bot. 1893, pp. 141, 206). An examination of the specimen (in Herb. Mus. Brit.) upon which the record is founded has shown that it is *Halosaccion ramentaceum*. It is extremely doubtful, however, that this specimen actually was collected in South Africa and it is suggested that *H. ramentaceum* be excluded from the flora of South Africa. The species is at home in the colder waters of the North Atlantic and North Pacific.

Pterosiphonia cloiophylla (Ag.) Falkenberg, in Schmitz, Flora, 72 : 448, 1889 ; Rhodomelaceen : 271, 1901. *Rhodomela cloiophylla* C. Agardh, Sp. alg., 1(2) : 375, 1822. *Polysiphonia acanthina* J. Agardh, Sp. alg., 2(3) : 936, 1863. *Pterosiphonia acanthina* (J. Ag.) Falkenberg, Rhodomelaceen : 275, 1901.

In *Pterosiphonia cloiophylla* the segments of the thallus form five pericentral cells and the disticho-alternate branches are separated by an interspace of two or more segments. As a synonym under this species must be included *Pterosiphonia acanthina* (J. Ag.) Falkenberg. According to Falkenberg (1901) *P. acanthina* has 8—12 pericentral cells, but in the type specimen (No. 39380 in Herb. Agardh) the segments contain but five pericentral cells. J. Agardh (1863) states that the species has five to six pericentral siphons. The type of *P. acanthina* is slenderer than typical *P. cloiophylla*, but comes within the wide range of variation of this species.

The writer has not had the opportunity of examining the material which Falkenberg referred to *P. acanthina*, but none of the known South African complanate species of *Pterosiphonia* contain eight or more pericentral cells.

As pointed out by Falkenberg (1901), *P. cloiophylla* is very closely related to *P. complanata* of the North Atlantic and Mediterranean and is retained as a separate species essentially owing to its different geographical distribution. Pending a comparative study of the two species, based on fixed material, it seems best to follow Falkenberg in retaining the South African plant as a distinct species.

Gymnothamnion elegans (Schousboe ex C. Ag.) J. Agardh, Anal. alg. : 27, pl. 1, figs. 11—14, 1892. *Callithamnion elegans* Schousboe ex

C. Agardh, Sp. alg., 2 : 162, 1828. *Plumaria Schousboei* (Bornet) Schmitz, Nuova Not., 7 : 7, 1896.

This widely distributed species is here recorded for the first time from South Africa. It was associated with *Bostrychia mixta* at East London (Shelly Beach) and at Oudekraal in the Cape Peninsula. The South African plants agree well with the type material (No. 18198 in Herb. Agardh).

Considerable confusion exists regarding the nomenclature of this species. J. Agardh (1892) founded the genus *Gymnothamnion* to receive *Callithamnion elegans* Schousb. ex C. Ag., but the majority of authors have followed Schmitz (1896) in referring the species to *Plumaria* (as *P. Schousboei*). The development of the procarp has not been studied in *G. elegans*,⁵ but vegetatively the species is sufficiently distinct from *Plumaria* to justify its removal to a different genus.

Acrosorium deformatum (Suhr) comb. nov. *Nitophyllum deformatum* Suhr, Verhandl. Kaiserl. Leopold.-Carol. Akad. Naturf., 18, Suppl. 1 : 282, pl. 2, fig. 5, 1841. *Schizoglossum Bartlingianum* Kützing, Sp. alg. : 870, 1849 (with respect to syn. *N. deformatum* Suhr only). *Nitophyllum acrospermum* J. Agardh, Sp. alg., 2(2) : 655, 1852 (with respect to syn. *N. deformatum* Suhr and specimen of Suhr only).

An examination of some of Suhr's original material of *Nitophyllum deformatum* has shown that this name applies to a species of *Acrosorium* distinct from *Acrosorium acrospermum* (formerly *Nitophyllum acrospermum*) under which it was included as a doubtful synonym by J. Agardh (1852, p. 656), and where it has remained up to the present (cf. De Toni, Syll. Alg. 1900, p. 649).

The writer has seen three sets of Suhr's material of this species : two packets were received on loan from Herb. Berlin, and Herb. Agardh contains a mount under No. 30641. The source of the specimens in one of the packets in Herb. Berlin is given as "Kaffernküste" while those in the other packet as well as the mount in Herb. Agardh came from Algoa Bay. It is proposed to designate as lectotype the material in Herb. Berlin that is marked as coming from Algoa Bay. This packet contains the following notation : "Abgebildet in der bot. Zeitung für 1837 fig. 53." As far as the writer is aware, however, the plant was illustrated for the first time in the paper containing Suhr's (1841) description of the species.

The writer has also collected this plant at a number of localities along the east coast of South Africa. The species is small, measuring

⁵ The diagram of the procarp given by Feldmann-Mazoyer (Rech. Cérám. M éd. occ., 1940, p. 192) is not of *G. elegans* but of *Plumaria elegans* (Bonnem.) Schmitz.

less than 5 mm. in height, and usually occurs as an epiphyte on a species of *Gelidium*.⁶

Bostrychia simpliciuscula Harv. ex J. Agardh, Sp. alg., 2(3) : 854, 1863. *Bostrychia tenuis* Post f. *simpliciuscula* (Harv. ex J. Ag.) Post, Rev. Algol., 9 : 23, 1936.

This species was reported from South Africa by Post (1936) under the name *Bostrychia tenuis* f. *simpliciuscula*. The procedure whereby Post reduces the original species, *B. simpliciuscula*, to a form under a species, *B. tenuis*, described as new by her is, however, not in conformity with Article 56 of the International Rules of Botanical Nomenclature (1935).

Laurencia complanata (Suhr) Kützing, Sp. alg. : 857. 1849. *Chondria complanata* Suhr, in Krauss, Flora, 29 : 211, 1846.

An examination of one of Krauss' original specimens (in Herb. Inst. allg. Bot. Hamburg) of *Chondria complanata* Suhr has shown that this binomial applies to the South African plant that has passed for a long time under the name *Laurencia concinna*. Kützing, without apparently having seen the species, in 1849 transferred *Chondria complanata* to the genus *Laurencia*. The plant is not uncommon along the east coast of South Africa.

Yamada (Univ. Calif. Publ. Bot. 16(7), 1931) does not refer to *Laurencia complanata* but considers *L. concinna* Montagne (Prod. Gen. Sp. Phyc. 1842, p. 6) as being synonymous with *L. Brongniartii* J. Agardh (Linnaea, 1841, p. 20). The type specimen of *L. Brongniartii* is hardly complanate in the dried condition and suggests a species entirely distinct from *L. complanata*. *L. concinna*, on the other hand, is complanate, but Yamada's (1931) description and photo of the type of this plant indicate that it also is distinct from *L. complanata*.

Laurencia pumila (Grun.) comb. nov. *Laurencia flexuosa* Kütz. var. *pumila* Grunow, Algae Novara : 87, 1867.

The writer knows this plant from the type⁷ as well as from his own material, collected at a number of localities along the east coast of South Africa. Grunow described it as a variety, var. *pumila*, under *Laurencia flexuosa*. It seems best, however, to elevate var. *pumila* to specific rank since the only apparent feature that it has in common with *L. flexuosa*

⁶ This species has been referred to *Gelidium corneum* by some authors and to *G. rigidum* (now *Gelidiella acerosa*) by others, but the writer is still uncertain of its identity.

⁷ The specimen is in Diesing's collection in Herb. Naturhist. Mus. Vienna. Grunow credits Gueinzus as the collector of the specimen, but according to the label it was collected by Pöppig. In his account of the algae of the Novara Expedition, Grunow erroneously gave the name of Gueinzus instead of that of Pöppig as the collector of several South African algae.

is that both are somewhat complanate. *L. pumila* is a small plant, seldom attaining a height of more than 5 cm., while *L. flexuosa* frequently attains a height of 20 cm. or more.

Acanthophora orientalis J. Agardh, Sp. alg., 2(3): 820, 1863. The record of this species is based on four specimens (in Herb. Mus. Brit.) that were collected by Bowerbank in Algoa Bay. Barton (Journ. Bot. 1893, p. 174) referred these specimens to *Acanthophora muscoides*, but as the plants lack spines on the main branches they cannot be assigned to this species. A comparison of the specimens with other species of *Acanthophora* has shown that they are representative of *A. orientalis*. This species has been reported from Zanzibar in East Africa and apparently has a wide distribution in the Indian Ocean.

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SOME NEW SPECIES AND VARIETIES IN THE GENUS HAWORTHIA.

By G. G. SMITH.

(WITH PLATES I AND II.)

Haworthia Reinwardtii v. committeesensis G. G. Smith. (Liliaceae—Aloineae.) Sect. Coarctatae.

Caulis foliatus longitudine 17 cm., diam. una cum foliis 38 mm., a basi proliferans, fasciculis cito effectis.

Folia erecta vel erecto-divergentia, incurvata, longitudine 44 cm., latitudine ad basim 14 mm., lanceolata, acuminata; *supra* plana vel convexa, laevia, pallide viridia; *subtus* convexa, tuberculis albis, prominentibus, orbiculatis et oblongis in 12 lineas transversales seriatis instructa.

Pedunculus simplex, diam. $1\frac{1}{2}$ mm., longitudine una cum racemo circiter 42 cm., rubro-fuscus; *racemus* 16 floribus, longus circiter 16 cm.; *pedicellus* longus $2\frac{1}{2}$ mm., pallide fuscus; *bractee steriles* 3; *perianthium* album, longum 16 cm.

Leafy stem 17 cm. long and about 38 mm. diam. including the leaves, proliferous from the base and soon forming large clusters.

Leaves multifarious, ascending-spreading, incurved, firm, 44 mm. long, 14 mm. broad at the base, $6\frac{1}{4}$ mm. thick, lanceolate, acuminate; *face* flat-concave, smooth or occasionally with a few very small slightly raised whitish tubercles on the raised middle line, light green; *back* rounded, with 12 rows of raised white round and oblong about $\frac{3}{4}$ mm. diam. tubercles arranged in distinct transverse rows, and about the same number of indistinct longitudinal rows, the tubercles oblong transversely and the transverse rows $2\frac{1}{4}$ mm. apart at the middle of the leaf, green, becoming brownish-green towards the tip; *keel* oblique.

KEY TO THE DRAWINGS.

F = Leaf face.
LS = Longitudinal section.
SB = Section near base.
INF = Inflorescence.
O & S = Ovary and Stamens.
C = Capsule.

B = Leaf back.
SM = Section near middle.
ST = Section near tip.
Del. M. C. L. = Drawn by Miss M.
Courtenay-Latimer.

Peduncle simple, terete, $1\frac{1}{2}$ mm. diam., about 42 cm. long including the raceme, reddish-brown below; *raceme* sub-laxly 16 flowered, about 16 cm. long, flowers spirally-unilaterally arranged, 1—2 open simultaneously; *pedicels* $2\frac{1}{2}$ mm. long, $\frac{3}{4}$ mm. diam., light brown; *sterile bracts* 3, about 4 mm. long; *fertile bracts* $2\frac{1}{2}$ —3 mm. long, deltoid, acute, light brown with a very dark brown medium-fine nerve; *perianth* white 16 mm. long, the triangular-hexagonal sub-globose shortly (1 mm.) stipitate base 4 mm. diam., constricted above to 3 mm. diam., oblong, erect-spreading, somewhat curved; *upper segments* obtuse, about equally recurved, the faces each with a broad greenish-brown nerve; *lower segments* obtuse, the 2 outer spreading, replicate and the faces each with a broad dark green nerve, the inner segment channelled and the face with a medium-fine nerve which is reddish below and green above, the inner and outer much recurved and about equal in length; *stamens* 4—5 mm. long; *ovary* $3\frac{1}{2}$ mm. long, $1\frac{1}{2}$ mm. diam., light green; *style* $1\frac{1}{4}$ mm. long, straight, somewhat capitate, whitish; *capsule* 13 mm. long, 3 mm. diam.

Habitat: Cape Province: Albany Division; (Type, G. G. Smith, 551, in Nat. Bot. Gdns. Herb., Kirstenbosch; Nat. Herb., Pretoria; Museum, East London.)

Distribution: not further known.

This variety was collected by the Author in Jan., 1935, in the Committees Valley on the banks of a small stream. It differs from the typical form in being a much smaller plant, the younger leaves being lighter green and the older more reddish, the tubercles smaller and less prominent. In general appearance it resembles var. *minor*, which plant, however, is much smaller and has more face tubercles.

Haworthia Reinwardtii v. peddiensis G. G. Smith. Sect. Coarctatae.

Caulis foliatus longus 13 cm., diam., una cum foliis 42 mm., a basi proliferans, fasciculos densos efferens.

Folia crebra, multifaria, erecta, incurvata, longa 28 mm., basim versus lata $12\frac{1}{2}$ mm., lanceolata, acuto-acuminata; *supra* plano-convexa, tuberculis valde parvis pallidis vel concoloribus ornata; *subtus* convexa, tuberculis albis orbiculatis oblongisque in 10—12 lineas \pm undulatas transversales seriatis percurta, eis in carina paucisque margines versus transversaliter oblongis et confluentibus.

Pedunculus simplex, diam. $1\frac{1}{2}$ mm., una racemo longus 30 cm.; *pedicellus* longus 4 mm.; *bractee steriles* 5; *bractee fertiles* $1\frac{1}{2}$ —2 mm. longae, deltoideae, acutae; *ovarium* longum $3\frac{1}{2}$ mm., diam. $1\frac{3}{4}$ mm., pallide viride.

Leafy stem up to 13 cm. long and 42 mm. diam. including the leaves, proliferous from the base and soon forming dense clusters, erect.

Leaves crowded, multifarious, erect, incurved, firm, 28 mm. long, 12½ mm. broad near the base, 4½ mm. thick below the middle, lanceolate, acute-acuminate, cuspidate; *face* flat-convex, with a number of very small slightly raised lighter coloured to concolorous tubercles in the upper

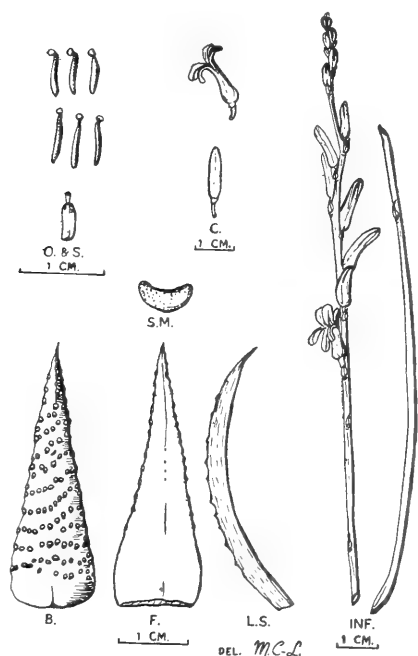


Fig. 1. *H. Reinwardtii* var. *committeesensis*.

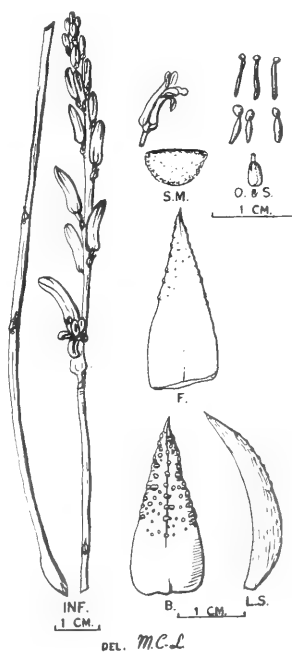


Fig. 2. *H. Reinwardtii* var. *peddiensis*.

half and arranged mostly in 3 longitudinal rows, light green; *back* rounded, beset with 10—12 somewhat undulated transverse rows of raised white mostly round up to $\frac{3}{4}$ mm. diam. tubercles, becoming smaller towards the base and tip, those on the \pm oblique keel and a few mostly near the margins transversely oblong and sometimes confluent, also arranged in 10—12 indistinct longitudinal rows, the transverse rows 1½—2 mm. apart at the middle of the leaf, green, becoming light brownish-green with age.

Peduncle simple, terete, $1\frac{1}{2}$ mm. diam., 30 cm. long including the raceme, dark brown below; *raceme* 12 cm. long, 20 flowers and buds, 1—2 open simultaneously; *pedicels* 4 mm. long, 1 mm. diam., erect, light greenish-brown; *sterile bracts* 5, the lowest 7 cm. from base, 3—5 mm. long; *fertile bracts* $1\frac{1}{2}$ —2 mm. long, deltoid, acute, white with a broad dark brown nerve; *perianth* white, 16 mm. long, the sub-globose cylindrical-hexagonal shortly stipitate base 4 mm. diam., constricted above to $3\frac{1}{2}$ mm., oblong, erect-spreading, curved; *upper segments*: face colour of the 2 outer segments pink with a medium-fine dark greenish-brown nerve which is red towards tip, face colour of inner segment green, the broad nerve dark green below and becoming red above, all obtuse and only slightly recurved; *lower segments*: face colour of the 2 outer segments pinkish-white above, green below with a fine light-brown nerve, face colour of the inner segment pink, the broad nerve dark greenish-brown below becoming red above, all obtuse, the 2 outer replicate and recurved, the inner channelled and more recurved; *stamens* 4 and 5 mm. long; *ovary* $3\frac{1}{2}$ mm. long, $1\frac{3}{4}$ mm. diam., light green; *style* 1 mm. long, greenish-white, somewhat bent.

Habitat: Cape Province: Peddie Division; (Type, G. G. Smith, 656, in Nat. Bot. Gdns. Herb., Kirstenbosch; Nat. Herb., Pretoria; Museum, East London.)

Distribution: not further known.

This variety was discovered by the Author in 1934, about 12 miles east of Hunts Drift, Fish River, growing on grassy slopes facing north. Compared with *H. Reinwardtii* Haw., it is a smaller plant, has shorter and less acuminate leaves, the face tubercles are in more or less 3 longitudinal rows, and there are more sterile bracts (4—5). It is nearest allied to *v. fallax* von Poellnitz, which plant, however, is paler green, has smooth or nearly smooth leaf-face, and leaves more spreading at apex of plant.

Haworthia Reinwardtii v. kaffirdriftensis G. G. Smith. Sect. *Coarctatae*.

Caulis foliatus longus 12 cm., diam. una cum foliis 36 mm., a basi proliferans.

Folia crebra, ascendencia, incurvata, 25 mm. longa, ad basim 8—10 mm. lata, lanceolata, acuto-acuminata; *supra* plana-convexa, laevia vel quibusdam senioribus paucis tuberculis albis ornatis; *subtus* convexa, candidis tuberculis prominentibus, plerumque orbiculatis in 5—8 lineis longitudinalibus percursa.

Pedunculus simplex, diam. $1\frac{1}{4}$ mm., una cum racemo longus 30 cm.;

pedicellus longus $4\frac{1}{2}$ mm.; *bracteae* steriles 3; *bracteae fertiles* longae 3 mm.; *perianthium* 17 mm. longum.

Leafy stem 12 cm. long and 36 mm. diam. including the leaves, proflerous from the base and forming clusters, erect.

Leaves crowded, multifarious, ascending, incurved especially at tip, firm, 25 mm. long, 8—10 mm. broad at the base, $3\frac{1}{2}$ mm. thick near middle, lanceolate, acute-acuminate, cuspidate; *face* flat-convex, with 1—2 raised concolorous lines, smooth, or with a few white tubercles on some of the very old leaves, green; *back* rounded, beset with raised pure white mostly round tubercles which are arranged in 5—8 distinct longitudinal rows, those on the keel or middle row up to $1\frac{1}{2}$ mm. diam., becoming smaller towards the margins, tip and base, often confluent in long longitudinal bands, on the margin in the upper $\frac{1}{2}$ they are small and very crowded or confluent, the tubercles in the middle longitudinal row about 2 mm. apart, green below and darker green above.

Peduncle simple, terete, $1\frac{1}{4}$ mm. diam., 30 cm. long including the raceme, dark brown below; *raceme* 10 cm. long, about 20 flowers and buds which are somewhat spirally arranged, 2—3 open simultaneously; *pedicels* $4\frac{1}{2}$ mm. long, $\frac{3}{4}$ mm. diam., erect, very light brown; *sterile bracts* 3, the lowest about 10 cm from the base, 5 mm. long; *fertile bracts* 3 mm. long, deltoid, acute, light brown with a broad reddish-brown nerve; *perianth* light pinkish-white, 17 mm. long, the $3\frac{1}{2}$ mm. diam. cylindrical-hexagonal sub-globose somewhat stipitate base tapering to the pedicel, slightly constricted above, oblong, erect-spreading, slightly curved; *upper segments*: the 2 outer segments white with a medium-fine greenish-brown nerve, the inner one with a broad greenish brown nerve, obtuse, all straight or only slightly recurved near the tips; *lower segments* same colour as the upper, the 2 outer replicate and slightly spreading, the inner channelled, all recurved at an angle of about 90 degrees; *stamens* 4 and 5 mm. long; *ovary* 3 mm. long, $1\frac{1}{2}$ mm. diam., light green; *style* 1 mm. long, yellowish-green, straight, clavate; *capsule* 9 mm. long, 3 mm. diam., green, somewhat shining.

Habitat: Cape Province: Peddie Division, near Kaffir Drift, about 14 miles south to south-west of Peddie. (Type G. G. Smith 3364, in Nat. Bot. Gdns. Herb., Kirstenbosch; Nat. Herb., Pretoria; Museum, East London.)

Distribution: not further known.

This variety was collected by the Author in May 1940, at Kaffir Drift. Its most striking character and one by which it is immediately

recognised is the distinct arrangement of the very conspicuous snow-white tubercles in longitudinal, mostly confluent rows, and in this respect differs from *H. Reinwardtii* and all previously described varieties.

Haworthia Reinwardtii* v. *valida G. G. Smith. Sect. *Coarctatae*.

Caulis foliatus, longus 12 cm., diam. una cum foliis 45 mm., a basi proliferans.

Folia multifaria, ascendens, apicem versus incurvata, longa

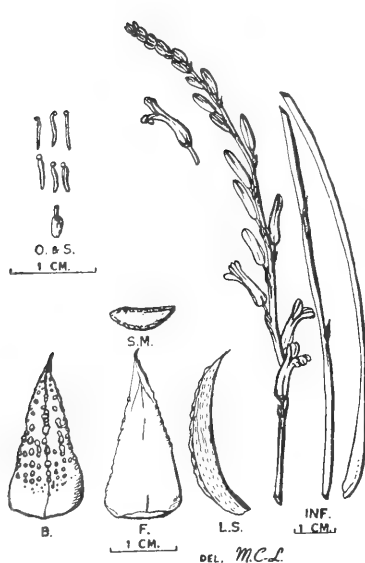


Fig. 3. *H. Reinwardtii* var. *kaffir-driftensis*.

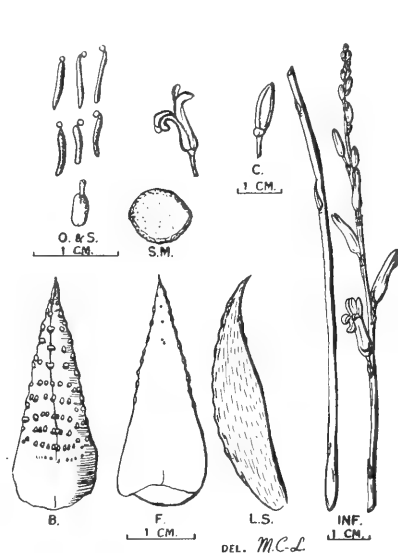


Fig. 4. *H. Reinwardtii* var. *valida*.

circiter 30 mm., ad basim lata 12 mm., lanceolata, acuminata; *supra* incurvata, laevia vel paucis tuberculis parvis concoloribus ornatus plerumque in linea media; *subtus* convexa, albis tuberculis prominentibus plerumque orbiculatis in 9—10 lineas transversales seriatis percurta.

Pedunculus simplex, diam. $1\frac{1}{2}$ mm., una cum racemo longus 12 cm., floribus et gemmis 16; *pedicellus* longus $4\frac{1}{2}$ —5 mm., diam. $1\frac{1}{4}$ mm.; *bractee steriles* 2—3; *bractee fertiles* longae $1\frac{1}{2}$ — $2\frac{1}{2}$ mm., deltoideae, acuminatae; *perianthium* griseo-album, longum 18 mm., basi subglobosa diam. $4\frac{1}{4}$ mm.; *ovarium* longum $2\frac{1}{4}$ mm., diam. $1\frac{1}{2}$ mm.

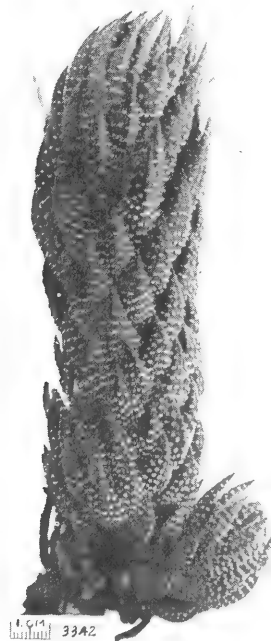


PLATE I.

1. *H. Reinwardtii* var. *committeesensis*.
2. *H. Reinwardtii* var. *peddiensis*.
3. *H. Reinwardtii* var. *kaffirdriftensis*.
4. *H. Reinwardtii* var. *valida*.

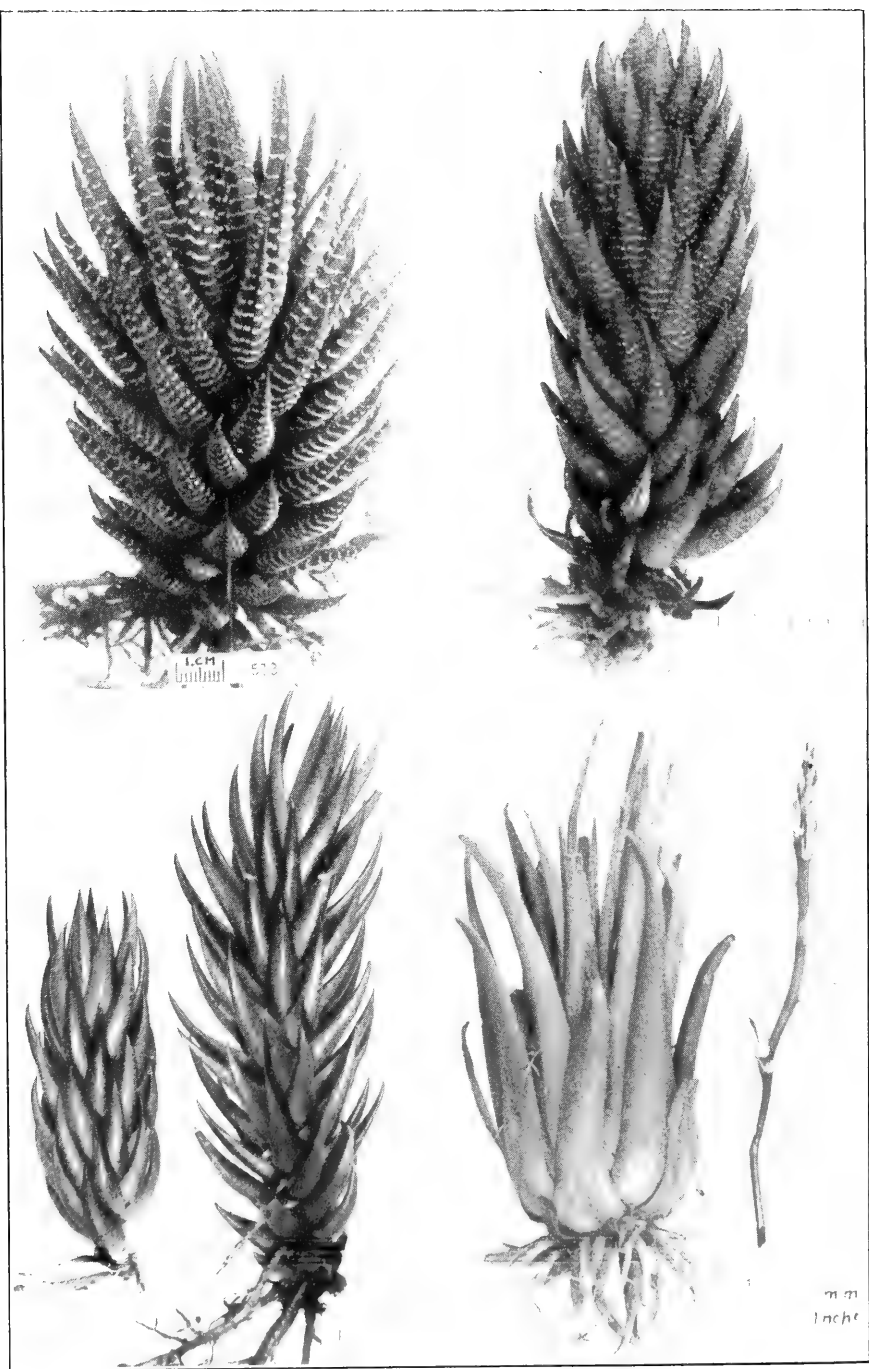


PLATE II.

5. *H. Reinwardtii* var. *chalumensis*.
 7. *H. Greenii* var. *silvicola*.

6. *H. fulva*.
 8. *H. angustifolia* var. *grandis*.

Leafy stem 12 cm. long and 45 mm. diam. including the leaves, profliferous from the base and forming clusters, erect.

Leaves crowded, spirally arranged, multifarious, ascending, incurved towards the tip, firm, about 30 mm. long, 12 mm. broad at base, 6 mm. thick at middle, lanceolate, acuminate, minutely cuspidate; *face* rounded, smooth or with a few small raised concolorous tubercles mostly on the somewhat raised middle line, light green at base and becoming dark green at tip, dull; *back* rounded, beset with mostly round, raised, white, $\frac{3}{4}$ mm. diam. tubercles which are sometimes transversely confluent mostly on the keel or middle and arranged in 9—10 transverse and 10—11 indistinct longitudinal rows, the transverse rows about 2 mm. apart at the middle of the leaf, light green at base and becoming dark green at the tip, dull.

Peduncle simple, terete, $1\frac{1}{2}$ mm. diam. below, including the raceme 35 mm. long, greenish-brown below; *raceme* 12 cm. long, 16 flowers and buds, 1—2 open simultaneously; *pedicels* $4\frac{1}{2}$ —5 mm. long, $1\frac{1}{4}$ mm. diam., dull reddish-brown; *sterile bracts* 2—3; *fertile bracts* $1\frac{1}{2}$ — $2\frac{1}{2}$ mm. long, deltoid, acuminate, dull brown with a dark brown nerve; *perianth* greyish-white, 18 mm. long, the cylindrical-hexagonal stipitate sub-globose base $4\frac{1}{4}$ mm. diam., slightly constricted above, oblong, erect-spreading, only slightly curved; *upper segments* obtuse, face colour of the 2 outer segments pale pinkish-white with a greenish-brown nerve, face colour of inner segment pale green with greenish-brown nerve, all slightly recurved; *lower segments*: face colour of 2 outer segments pale green with a pale brown nerve, replicate, face colour of inner segment pale pinkish-white with a pale greenish-brown nerve, all very recurved; *stamens* $4\frac{1}{2}$ and $6\frac{1}{2}$ mm. long; *ovary* $3\frac{1}{4}$ mm. long, $1\frac{1}{2}$ mm. diam., green; *style* $1\frac{1}{2}$ mm. long, clavate.

Habitat: Cape Province: Peddie Division; (Type G. G. Smith 3342, in Nat. Bot. Gdns. Herb., Kirstenbosch; Nat. Herb. Pretoria; Museum, East London.)

Distribution: not further known.

This plant is described from material collected by Mr. F. Coetzee in May, 1940, about 10 miles south to south-west of Peddie. It differs from the typical form in its somewhat smaller size, more sturdy appearance, sometimes confluent more prominent whiter back tubercles, and from v. *Archibaldiae* in its neater appearance, smaller and less crowded back tubercles, and from both in its almost smooth leaf face.

Haworthia Reinwardtii* var. *chalumnensis G. G. Smith. Sect. *Coarctatae*.

Caulis foliatus simplex, altitudine circiter 13 cm., diam. una cum foliis 63 mm., a basi proliferans.

Folia erecta vel erecto-divergentia, 40—50 mm. longa, 13—16 mm. ad basim lata, parum incurvata, seniores lanceolata, juniores late lanceolata acuminata; *supra* plana vel incurvula, juniores fusco viridia, seniores fuscida, parte superiore tuberculis parvis, albidis, orbiculatis inaequaliter ornata; *subtus* convexa, obscure carinata, colore pulliora quam supra ordinibus 12—14 transversis percurta tuberculorum parvorum, prominentium, albidorum, orbiculorum vel oblongorum, plerumque confluentium.

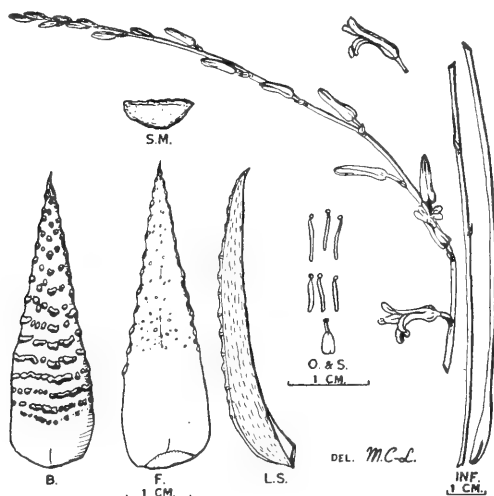


Fig. 5. *H. Reinwardtii* var. *chalumnensis*.

Pedunculus simplex, diam. $1\frac{1}{2}$ mm., una sum racemo 36 cm. longus; *pedicelli* $3\frac{1}{2}$ mm. longi; *perianthium* roseo-albidum, 19 mm. longum; *stamina* 5—6 mm. longa; *ovarium* $3\frac{1}{2}$ mm. longum, diam. $3\frac{1}{2}$ mm.; *stylus* $1\frac{1}{4}$ mm. longus.

Leafy stem simple, about 13 cm. tall and 63 mm. diam. including the leaves, proliferous from the base and forming dense clusters.

Leaves ascending to multifarious, 40—50 mm. long, 13—16 mm. broad at base, $4\frac{1}{2}$ — $6\frac{1}{2}$ mm. thick near base, only slightly incurved, old leaves lanceolate, young broadly lanceolate,

acuminate, falcate; *face* flat to rounded, with an indistinct raised concolorous longitudinal line, dark green when young to greenish-brown when old, and with reddish tips, irregularly beset in the upper half and along the concolorous line with small, roundish, whitish tubercles up to $\frac{3}{4}$ mm. diam.; *back* rounded, obscurely and somewhat obtusely keeled, darker green than the face, and with brown tips when young, brownish green with brown tips when old, with 12—14 transverse somewhat undulated rows of small, raised, pure white round and oblong transversely truncated tubercles, $\frac{3}{4}$ mm. diam., mostly confluent into lines for almost the whole width of the leaf, but becoming solitary and smaller towards the tip, the transverse rows $2\frac{1}{2}$ —3 mm. apart at the middle of the leaf.

Peduncle simple, terete, $1\frac{1}{2}$ mm. diam., 36 cm. long including the raceme, dark to greyish-brown below; *raceme*: flowers and buds about 18, 1—2 open at a time; *pedicels* $3\frac{1}{2}$ mm. long, 1 mm. diam., light greyish-brown; *sterile bracts* 3; *fertile bracts* $2\frac{1}{2}$ —3 mm. long, deltoid acuminate, light brown with a fine dark brown nerve; *perianth* pinkish-white, 19 mm. long, the cylindrical-hexagonal tapering-stipitate sub-globose base $3\frac{1}{2}$ mm. diam., constricted to 3 mm. diam. above the base, oblong, erect-spreading, tube somewhat curved; *upper segments* obtuse, all straight and equal in length; *lower segments* obtuse, recurved at an angle of about 50 degrees and equal in length, the outer ones replicate, not spreading the inner one channelled; *stamens* 5—6 mm. long; *ovary* $3\frac{1}{2}$ mm. long, $1\frac{1}{4}$ mm. diam., light green; *style* $1\frac{1}{4}$ mm. long, greenish-white, straight.

Habitat: Cape Province: East London Division. (Type G. G. Smith 513, in Nat. Bot. Gdns. Herb., Kirstenbosch; Nat. Herb., Pretoria; Museum, East London.)

Distribution: not further known.

This very distinct variety was collected by the Author in 1934 on the banks of the Chalumna River, about 30 miles west of East London. It differs from the typical form by its greater diameter, longer and more spreading leaves, more numerous transverse rows of tubercles on the back of leaf (up to 14), and by these being mostly confluent. It differs from all other varieties of the species also by its more spreading leaves and more confluent back tubercles. Compared with *v. conspicua*, which also has confluent tubercles, the tubercles are much larger and more conspicuous and the leaves are shorter and narrower.

Haworthia fulva G. G. Smith. Sect. *Coarctatae*.

Caulis foliatus simplex, altitudine 11 cm. circiter, diam. una cum foliis 38 mm., a basi proliferans.

Folia erecto-divergentia, longitudine circiter 29 mm., latitudine ad basim $9\frac{1}{2}$ mm., incurvata, late vel anguste lanceolata, acuta vel acuminate; *supra* convexa, paucis tuberculis parvis ornata concoloribus vel albidis, prominentibus; *subtus* convexa, numerosis parvis tuberculis solitariis percursa albedo-viridibus vel albis, orbiculatis et \pm oblongis, prominentibus in lineas transversales circiter 12 instructis.

Pedunculus simplex, diam. $\frac{3}{4}$ mm., longitudine usque ad 31 cm. una cum racemo; *pedicelli* longitudine 3 mm., diam. 1 mm.; *bracteae steriles* duae; *bracteae fertiles* longum $1\frac{1}{2}$ mm., deltoideae, acuminatae; *perianthium* album, longum 16 mm.

Leafy stem simple, about 11 cm. tall and 38 mm. diam., including the leaves, proliferous from the base and soon forming dense clusters.

Leaves ascending-spreading, multifarious, about 29 mm. long, $9\frac{1}{2}$ mm. broad at the base and $4\frac{3}{4}$ mm. thick near the middle, slightly incurved with the extreme tip more incurved, young leaves broadly lanceolate and somewhat acute, becoming narrow lanceolate and acuminate when old; *face* convex, pale green when young, becoming greenish brown when old, with, on some leaves, a few small concolorous to whitish raised tubercles mostly in a row along the middle of leaf; *back* rounded, indistinctly keeled, somewhat darker than face, with light brownish tips, the young somewhat shining towards the tips, beset with about 12 transverse rows of small raised round and slightly oblong transversely truncated about $\frac{1}{2}$ mm. diam. solitary tubercles which are greenish-white on the young leaves and white on the old, the rows 2 mm. apart at the middle of the leaf, also indistinctly arranged in about 11 longitudinal rows.

Peduncle simple, terete, $\frac{3}{4}$ mm. diam., up to 31 cm. long including the somewhat lax flowered raceme, very light greenish brown below; *raceme*: flowers and buds about 10, 1—2 open at a time; *pedicels* 3 mm. long, 1 mm. diam., light bluish-green; *sterile bracts* $1\frac{1}{2}$ mm. long, deltoid, acuminate, very pale brown to dark reddish brown below, with a reddish brown nerve; *perianth* pure white, 16 mm. long, the cylindrical-hexagonal tapering-stipitate sub-globose base 3 mm. diam., slightly constricted above, oblong, erect, tube curved; *upper segments* obtuse, recurved, about equal in length; *lower segments* obtuse, more recurved, the outer ones replicate, the inner one channelled; *stamens* $4\frac{1}{2}$ — $5\frac{1}{2}$ mm. long; *ovary* 3 mm. long, $1\frac{1}{2}$ mm. diam., green; *style* $1\frac{1}{2}$ mm. long, slightly bent, capitate.

Habitat: Cape Province; Bathurst District. (Type G. G. Smith 3380, in Nat. Bot. Gdns. Herb., Kirstenbosch; Nat. Herb., Pretoria; Museum, East London.)

Distribution: not further known.

The most distinctive feature of *H. fulva* which separates it from other related species is the permanent reddish-brown shading in the older leaves, from which colour it gets its name. It is nearest allied to *H. Chalwinii* Marl. et Berger, which is sparsely distributed in the Port Elizabeth, Albany and Bathurst districts. It can be readily distinguished by its longer, narrower and more spreading leaves. Compared with *H. Reinwardtii* Haw., it is a much smaller plant, with shorter and nar-

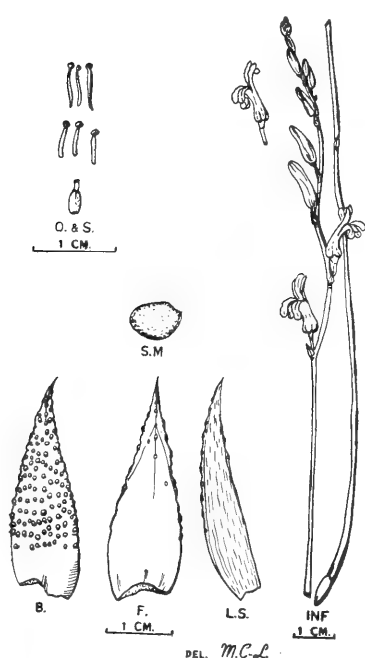


Fig. 6. *H. fulva*.

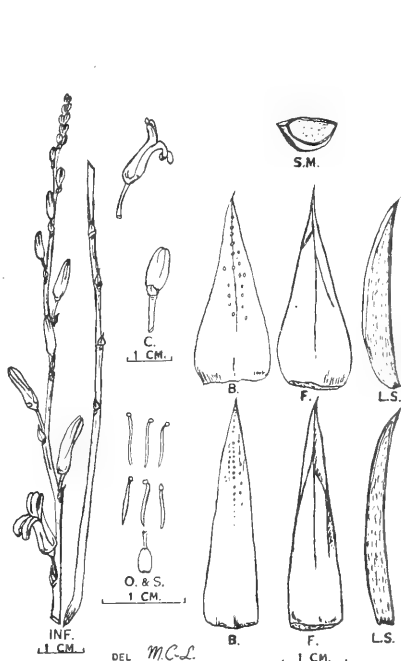


Fig. 7. *H. Greenii* var. *silvicola*.

rower leaves, and smaller tubercles. This small yet sturdy, neat and upright plant is described from material collected by the Author in May, 1940, on a farm near Port Alfred, in the Bathurst district.

***Haworthia Greenii* var. *silvicola* G. G. Smith. Sect. Coarctatae.**

Caulis foliatus simplex, altitudine usque ad 15 cm., diam. foliis inclusis 40 mm., erectus, sed vetustate procumbens, prolifer a base, claro-viridis supra, ad medium fusco-viridis, infra subfusco-viridis.

Folia conferta, plantae basin versus laxius ordinata, multifaria, adscendentia-explicata, parum incurvata, firma, ea prope apicem 22 mm. longa, 14 mm. lata; *facies* laevis, 3 lineis prominentibus longitudinalibus concoloribus prope apicem conjunctis; *subtus* convexa, tuberculis concoloribus vel albidis ad mediam plantam insertis, sed apicem basinque versus minus conspicuis.

Pedunculus simplex, $1\frac{1}{4}$ mm. diam., una cum racemo 25 cm. longus; *pedicelli* 6 mm. longi, $\frac{3}{4}$ mm. diam.; *bractae fertiles* 2 mm. longae; *perianthium* album 17 mm. longum.

Leafy stem simple, up to 15 cm. tall, including the leaves 40 mm. diam., erect but procumbent with age, proliferous from the base and forming clusters, reddish to light brownish-green in the sun.

Leaves crowded, towards the base somewhat loosely arranged, multifarious, ascending spreading, incurved, firm, at middle of plant 30 mm. long, 10 mm. broad at base, 4 mm. thick near base, lanceolate, acuminate, becoming shorter and broader towards the apex of plant and longer and narrower towards the base; *face* concave near the base, slightly rounded above, smooth, with 3 raised longitudinal concolorous converging lines, the middle one reaching the tip and the others (one on each side) leaving the margins in the lower half and meeting the middle line in the upper half but seldom at the same point, light brownish-green to light green; *back* rounded, beset with somewhat indistinct very slightly raised, solitary concolorous to whitish transversely oblong tubercles in the upper $\frac{3}{4}$, arranged along the keel and on both sides in more or less longitudinal rows, darker green than face, reddish towards the cuspidate tip; *keel* somewhat oblique, somewhat obscure towards the base; *margins* with tubercles similar to those on the back.

Peduncle simple, terete, $1\frac{1}{4}$ mm. diam., 25 cm. long including the raceme, dark reddish-brown; *raceme*, flowers and buds about 15, 1—2 open at a time; *pedicels* 6 mm. long, $\frac{3}{4}$ mm. diam., erect spreading, light green; *sterile bracts* 2; *fertile bracts* 2 mm. long, deltoid, acuminate, light brown, with a medium-fine very dark brown nerve; *perianth* white, bilabiate, 17 mm. long, the cylindrical-hexagonal tapering-stipitate sub-globose base 4 mm. diam., constricted to $3\frac{1}{4}$ mm. diam. above the base, oblong, erect-spreading, tube almost straight; *upper segments* obtuse, back tip colour white, with a fine dark reddish-brown nerve, the 2 outer recurved about 90 degrees and the middle one less; *lower segments* obtuse, the outer ones replicate and hardly spreading, the inner one channelled, all much recurved, about 135 degrees; *stamens* 4—5 mm long; *ovary* 3 mm. long, $1\frac{3}{4}$ mm. diam. below and tapering to the style, light green; *style* $1\frac{1}{2}$ mm. long, light yellow, straight, hardly capitate;

capsule up to 13 mm. long, $4\frac{1}{2}$ —5 mm. diam., oblong-elliptical, dark green.

Habitat: Cape Province: Bathurst Division: collected about 15 miles west of Port Alfred. (Type, G. G. Smith, 3378, in Nat. Bot. Gdns. Herb., Kirstenbosch; Nat. Herb., Pretoria; Museum, East London.)

Distribution: not further known.

This attractive plant, collected by the Author near Port Alfred, Bathurst District, in May, 1940, is much smaller than the species (type locality unknown), which occurs in the Albany District. During the growing period, especially in cultivation, the leaves vary in size and shape, those at the apex being about 22 mm. long, 14 mm. broad below, ovate, acute, and light green, while those at the middle are about 30 mm. long 12 mm. broad, ovate, acute-acuminate, dark green and those near the base of the plant are up to 40 mm. long, about 10 mm. broad, lanceolate-subulate, acuminate and dark brownish-green. On the young apical leaves the tubercles are concolorous and indistinct, on the middle leaves they are more distinct and greenish-white, becoming indistinct and more concolorous on the basal leaves. The plants are rather difficult to find as they grow under somewhat scattered *Euphorbia triangularis* in a dense forest (hence the name), near the top of a very steep, almost inaccessible hot slope facing north.

Haworthia angustifolia* var. *grandis G. G. Smith. Sect. *Loratae*.

Rosula acaulis, usque ad 10 cm. alta.

Folia numero circiter triginta, juniora erecta, apicem versus incurvata, seniora divergentia, longiora recurvata, plus minusve rigida, ad basim 60—100 mm. longa, 14 mm. lata, $3\frac{1}{2}$ mm. crassa, lanceolata, acuminata; *supra* concava basim versus, plana apicem versus; *subtus* ad basim convexa, apicem versus triangularia; *carina* basim versus obtusa, plus minusve acuta apicem versus; *marginibus* carinaeque parte superiore rarius minute denticulatis.

Pedunculus simplex, 1— $1\frac{1}{2}$ mm. diam., una cum racemo 20 cm. longus, rubido-fuscus; *pedicelli* 3 mm. longi, vix 1 mm. diam.; *bractee fertiles* 4 vel 5 mm. longae, deltoideae, acuminatae; *perianthium* griseo-roseum vel albidum, 14 cm. longum; *ovarium* $2\frac{1}{2}$ —3 mm. longum, $1\frac{1}{4}$ mm. diam., fulvo-viride.

* *Rosette* acaulescent, slowly proliferous from the base, up to 10 cm. tall.

Leaves about 30, the young ascending, incurved near the tip, the old ascending-spreading, long recurved, somewhat firm 60—100 mm. long, at

base 14 mm. broad and $3\frac{1}{2}$ mm. thick, lanceolate, acuminate, gradually narrowed from the base to the tip which has a whitish soon deciduous awn; *face* concave below, flat above, often with a broad raised concolorous middle line and with 5—7 indistinct longitudinal lines, very light yellowish-green, towards the tip of old leaves becoming reddish, dull; *back* rounded below, triangular towards the tip, smooth and with 5 somewhat indistinct somewhat raised longitudinal lines alternating with finer and more indistinct lines, light yellowish green in the upper $\frac{3}{4}$ and becoming darker

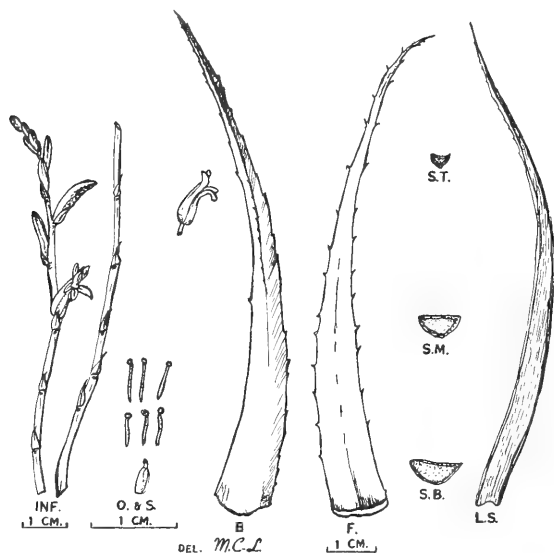


Fig. 8. *H. angustifolia* var. *grandis*.

below, tip reddish when old, dull; *keel* obtuse below, somewhat acute above, sparsely, irregularly and minutely toothed in the upper half, the teeth pellucid; *margins* somewhat blunt, sparsely and irregularly toothed from tip to near base of leaf, the teeth pellucid.

Peduncle simple, terete, $1-1\frac{1}{2}$ mm. diam., 20 cm. long including the lax raceme, reddish-brown; *raceme*, flowers and buds about 10, 1—2 open at a time; *pedicels* 3 mm. long, barely 1 mm. diam., light greenish-brown; *sterile bracts* about 12, 5—8 mm. long; *fertile bracts* 4—5 mm. long, deltoid, acuminate, white, with a fine light brown nerve; *perianth* dull pinkish white, 14 mm. long, 3 mm. diam. at the slightly enlarged

cylindrical-triangular base, $2\frac{1}{4}$ mm. diam above, ovate, erect-spreading, curved; *upper segments*: back tip colour dull pinkish white and with a fine very light reddish-brown nerve, the inner segment almost straight, obtuse, the outer ones recurved at an angle of almost 90 degrees and narrow, obtuse, shorter and narrower than the inner; *lower segments*: back tip colour dull pinkish white, with very fine dull green and light brown nerves, the inner segment very recurved, the outer ones recurved about 90 degrees and shorter, the inner and outer obtuse and channelled; *stamens* 5 mm. long; *ovary* $2\frac{1}{2}$ —3 mm. long, $1\frac{1}{4}$ mm. diam., yellowish green; *style* $\frac{1}{4}$ — $\frac{1}{2}$ mm. long, white, curved; *capsule* 12 mm. long, $3\frac{1}{2}$ mm diam., cylindrical-triangular, light green.

Habitat: Cape Province: Albany Division; collected by the Author in Jan., 1942, on a rocky hill facing north, fully exposed to the sun. (Type G. G. Smith, 5216, in Nat. Bot. Gdns. Herb., Kirstenbosch; Nat. Herb., Pretoria; Museum, East London.)

Distribution: not further known.

This very distinct variety differs from the typical in its more luxuriant growth, being about twice the size of *H. angustifolia*. In the shade it becomes a lighter green and the leaves are much more spreading. Compared with var. *albanensis* it is a much heavier plant with many more leaves, which are much longer (up to twice as long), and broader. The pedicels are 3 mm. long as against the almost sessile flowers of *v. albanensis* and the perianth is slightly shorter.

PLANTAE NOVAE AFRICANAE

“ Ex Africa semper aliquid novi.”—*Pliny*.

SERIES XIX.

By

MISS W. F. BARKER, PROFESSOR R. H. COMPTON, MISS F. M. LEIGHTON,
DR. R. A. DYER and MR. C. A. SMITH.

(WITH PLATE III.)

Ornithogalum brevifolium Leighton. (Liliaceae.)

Planta alt. ad 28 cm. *Bulbus* depresso-globosus, tunicis membranaceis brunneis, diam. ad 2 cm. *Folia* 6—8, linearia, canaliculata, apicibus acutis, per anthesin marcescentia, long. ad 13 cm., lat. ad 3 mm. *Scapus* erectus, alt. ad 26 cm. *Racemus* compactus, 4—20-fl., long. ad 7 cm. *Bracteae* membranaceae, e basi lata longe cuspidatae. *Pedicelli* adscendentes, long. 5—7 mm. *Perianthii segmenta* albida, externe leviter viridi-lineata, long. ad 10 cm., lat. ad 3·5 mm. *Filamenta* long. ad 7 mm., omnia basi leviter ampliata, exteriora lat. 1·5 mm., interiora 2 mm. *Ovarium* ovoideum, viride, long. 5 mm. *Stylus* long. 5 mm., stigmatibus decurrentibus. *Semina* atra, rugosa, long. 1·5 mm.

Plants up to 28 cm. high, usually somewhat shorter. Bulb white with brownish tunics partly adhering, up to 2 cm. in diam. Leaves many, up to 13 cm. long and 3 mm. broad, shrivelled at flowering time but apparently narrow, linear and channelled down the face, apex acute, base fairly broad, encircling the peduncle. Peduncle slender, green, flowers closely packed: pedicels up to 7 mm. long, bracts broad at the base but narrowed to a long point equal to or exceeding the pedicels. Flowers up to 2 cm. in diameter, creamy white with a faint tinge of green on the under side of the segments in buds and young flowers, fading to pure white as the flower ages. Segments obtuse, never spreading widely. Stamens 8 mm. long, the outer 1·5 mm., the inner 2 mm. broad. Ovary, style and stigma shorter than the stamens. Seeds black, rugose, 1·5 mm. long.

Hab. Cape Province. Cape Peninsula: Patrys Vlei, February 1941, Salter 8602 (*Type*, in Herb. Bolus). Caledon Division: Foothills of the Steenbras Plateau, *Stokoe* 7424.

This species flowered in a marshy place which had been burnt. It is very near to *O. comptum* Baker, but the leaves are not rigid.

Ornithogalum epigeum Leighton.

Planta glabra, alt. ad 36 cm. *Bulbus* globosus vel oblongo-globosus, tunicae griseae collis brevibus productis, diam. ad 2 cm. *Folia* basi vaginata anguste linearia, subulata, long. ad 20 cm., lat. ad 1 mm. *Scapus* alt. ad 30 cm. *Racemus* multiflorus, laxis, long. ad 10 cm. *Bracteae* minutae, e basi lata, cuspidatae. *Pedicelli* graciles, per anthesin long. 1 cm., deinde parum elongati, in fructu arcuati. *Perianthii* segmenta albida, externe viridi-vel brunneo-nervata, long. 5 mm., tria exteriora lat. 1·5 mm., tria interiora 2 mm. *Filamenta* exteriora basi paullo ampliata, interiora basi lat. 1·5 mm. *Ovarium* ovoideum, long. 3 mm. *Stylus* cum stigmate long. 2 mm. *Semina* atra rugosa, long. 1 mm.

A glabrous plant up to 36 cm. high with an oblong-globose bulb produced into a neck. Leaves vaginate at the base, narrow and wiry, up to 20 cm. long and 1 mm. broad. Inflorescence up to 30 cm. high, many-flowered. Bracts small, cuspidate with a broad base. Pedicels slender, about 1 cm. long at the flowering stage, but lengthening and becoming arcuate as the fruit develops. Perianth segments whitish or cream with a greenish or brown stripe down the underside. The three inner filaments appreciably broader at the base than the three outer. Ovary ovoid, 3 mm. long. Style and stigma together 2 mm. long. Seeds black, angulate, rugose, 1 mm. long.

Hab. Cape Province. Laingsburg Division : Karoo Garden, Whitehill, December 1941, *Compton* 12629 (*Type*, in Herb. Bolus and Herb. National Botanic Gardens) ; *Compton* 4082.

A slender wiry species with smaller flowers than is usual in the genus. The general appearance of the plant is suggestive of *Bulbinella*. The leaves are present at the flowering time although the tips are beginning to shrivel. The bulb is enclosed in a papery jacket which is extended upwards to form a distinct neck. The bulbs are often found growing partially or entirely above the surface of the ground.

Ornithogalum karooicum Leighton.

Planta alt. 10—26 cm. vel demum ultra. *Bulbus* globosus diam. 1 cm. *Folia* 3—4, vaginis per 1—1·5 cm. exsertis, viridi-maculatis, setosis, setis patentibus, laminis subdifformibus, infima ovale, long. 1 cm., lat. 6 mm., superioribus oblongo-lanceolatis, dense hirsutis, marginibus densissime pilis brevioribus ornatis, long. ad 3 cm., lat. ad 1 cm. *Scapus* alt. 9—24 cm. *Racemus* 2—12-fl., long. ad 8 cm. *Pedicelli* long. 10—15 mm. *Bracteae* e basi ovata, attenuatae, pellucidae, nervatae.



FIG. 1. A. *Ornithogalum epigeum*, plant $\times \frac{1}{2}$. 1. Outer and inner perianth segments $\times 2$. 2. Outer and inner stamens $\times 2$. 3. Gynaecium $\times 2$. 4. Seed $\times 10$.
 B. *O. karooicum* : C. *O. brevifolium* : D. *O. attenuatum* : plants $\times \frac{1}{2}$. 1. Outer and inner perianth segments. 2. Outer and inner stamens. 3. Gynaecium : all natural size. 4. Seed $\times 10$.

Perianthii segmenta nivea, obtusa, externe viridi-nervata, long. ad 15 mm., lat. 3—4 mm. *Filamenta* long. 5 mm., tria interiora quam exteriora basi latiora. *Stylus* cum stigmate long. 3 mm. *Ovarium* long. 3 mm. *Semina* nigra, angulata, rugosa, long. 1 mm., marginibus papillois, papillis sparsis obtusis.

Plants 10—26 cm. high, sometimes more. Bulb globose, about 1 cm. diam. Leaves 3—4, vaginate at the base: the vagina has dark green spots which turn red-brown when the leaves die, and sparse spreading hairs. The lowest leaf is very short and broad: the upper leaves are lanceolate: all are hairy and the margins are densely fringed with short hairs. Inflorescence 9—24 cm. high, 2—12-flowered. Pedicels 10—15 mm. long. Bracts membranous, nerved, attenuate from a broad base. Perianth segments white, obtuse, with a thin green stripe down the outside which turns reddish brown as the flower ages, usually from 10 to 15 mm. long and 3—4 mm. broad. Filaments rather more than half the length of the perianth segments, the three inner ones slightly broader than the three outer at the base. Style and stigma together 3 mm. long. Ovary 3 mm. long. Seeds black, angled, rugose with obtuse papillae, especially on the margins.

Hab. Cape Province. Laingsburg Division: Cabidu Farm, *Compton* 12109 (*Type*, in Herb. Nat. Bot. Gdns. and Herb. Bolus): Karoo Garden, Whitehill, September 1932, *Barker* in Herb. Bolus 22713; *Archer* in Herb. Bolus 22718: Matjesfontein Karoo, *Compton* 3584: dry flats near Matjesfontein, *H. Bolus* in Herb. Bolus 13450.

A small few-flowered species closely related to *O. distans* L. Bolus and *O. hispidum* Hornem. It differs from *O. distans* in having seeds with blunt papillae: in that species they are sharp and spiny. The three inner filaments in *O. distans* and *O. hispidum* are dilated at the base into spatulate structures, whereas in *O. karooicum* they widen gradually from the apex to the base. Again it differs from *O. hispidum* in having green (later brown) spots on the leaf bases, longer hairs on the leaves, and shorter sparser papillae on the seeds.

Ornithogalum attenuatum Leighton nom. nov., vice *O. angustifolium* L. Bolus, which had previously been employed for a French species.

The type of this species came from the Riversdale District but it has been found to have a fairly wide distribution.

Hab. Cape Province. Riversdale Division: Still Bay, *L. Bolus* in Herb. Bolus 20975 (*Type*); Corente River Farm, *Muir* in Herb. Galpin 5399; Onverwacht, Albertinia, *Muir* 1161. Knysna Division: *Duthie* 1149. Uniondale Division: Twee Rivieren, *Esterhuysen* 7060. Cape Division: Kanonberg, near Durbanville, *Salter* 1914; Vygekraal,

Wolley-Dod 317, 2291; (Cape Peninsula). Near Herzog, Retreat, *Wolley-Dod* 2305; Between Smitswinkel and Olifants Bosch, *Salter* 4259; Kenilworth Racecourse, *Salter* 7138; Keurboom Park, under pines, *Adamson* 3495.

Ornithogalum nannodes Leighton nom. nov., vice *O. pygmaeum* A. V. Duthie, which had been used by Willdenow for a plant which was later transferred to the genus *Gagea*.

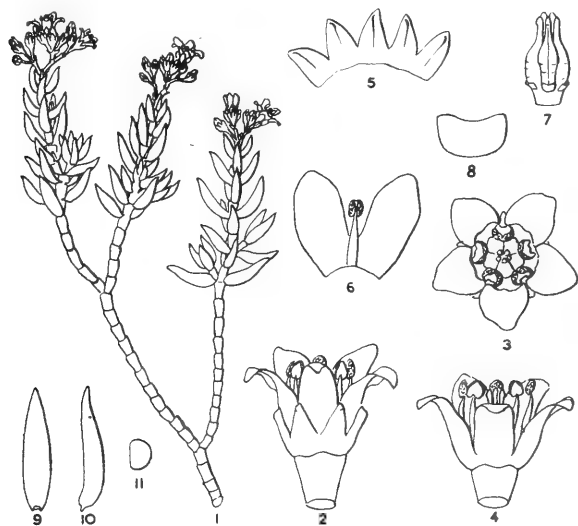


FIG. 2. *Crassula subsessilis*. 1. Portion of plant, natural size. 2. Flower side view $\times 5$. 3. Flower from above $\times 5$. 4. Flower with calyx removed $\times 5$. 5. Calyx $\times 5$. 6. Two petals with stamens attached $\times 5$. 7. Gynaecium $\times 5$. 8. Squama $\times 20$. 9. Leaf from below $\times 4$. 10. Leaf side view $\times 4$. 11. Transverse section of leaf $\times 4$. (Compton 14416.) Del. W. F. Barker.

Ornithogalum insigne Leighton nom. nov., vice *O. speciosum* Baker, which had previously been used for both *O. arabicum* and *Scilla peruviana*.

Crassula subsessilis Barker. (Crassulaceae—Isostemones.)

§ Campanulatae, Acutifolia Group.

Fruticulus divaricate ramosus, alt. ad 20 cm. *Caules* vetustiores efoliati, cicatricibus cincti, ultimi floriferi fere ad unam planitiem attingentes, internodiis subaequilongis, long. c. 2.5 mm. *Folia* oblonga

fusiforma, teretia, leviter connata. *Inflorescentia* terminalis, corymbosa, subsessilis. *Flores* parvi, breviter pedicellati. *Petala* alba, sine mucrone, base leviter connata, erecta, apice expansa, long. 3 mm. *Sepala* long. 1.5 mm. *Stamina* long. 2 mm. *Carpella* long. c. 2 mm. *Stylus* long 0.6 mm.

A small shrublet up to 20 cm. high. *Stem* much branched. Older branches efoliate and ringed by leaf scars, ultimate flowering branches

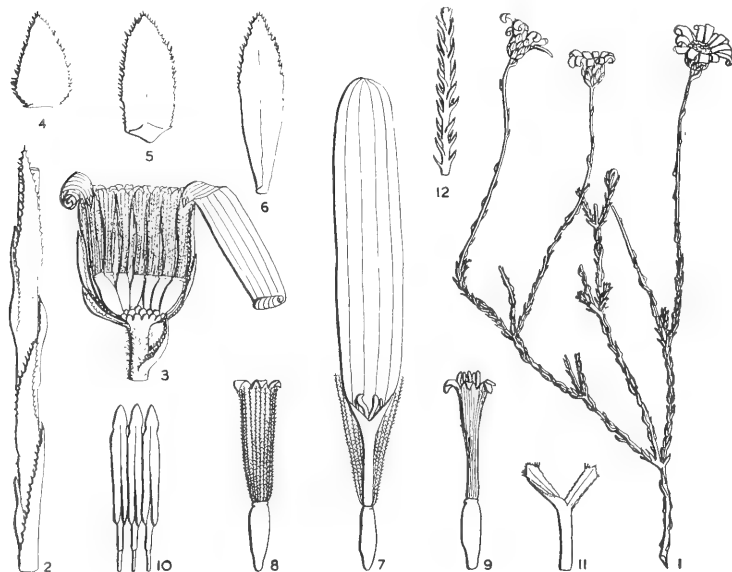


FIG. 3. *Felicia stricta*. 1. Portion of plant $\times \frac{1}{2}$. 2. Stem and leaves $\times 5$. 3. L.S. Capitulum $\times 3$. 4. Outermost bract. $\times 5$. 5. Middle bract $\times 5$. 6. Innermost bract $\times 5$. 7. Ray floret $\times 5$. 8. Disc floret $\times 5$. 9. Disc floret with pappus removed $\times 5$. 10. Stamens $\times 10$. 11. Style $\times 10$. 12. Pappus bristle $\times 25$. (Compton 5838.) Del. E. Wasserfall.

all reaching about the same level, having about 10 pairs of leaves, the lowest ones with short branches in their axils, internodes about 2.5 mm. long, reddish, upper ones green and not elongating, representing what can be called the peduncle to the inflorescence. *Leaves* glaucous green, slightly connate at the base, glabrous, oblong fusiform, very convex on the back, slightly flattened on the face, up to 1 cm. long, 2 mm. diam. towards the base, upper gradually becoming smaller. *Inflorescence* terminal, corymbose, up to 20-flowered. *Flowers* small, shortly pedicelled,

bracts and bracteoles minute. *Calyx segments* ovate, acute, 1.5 mm. long, connate for about one-third. *Petals* white, oblong, obtuse, without mucro, erect, spreading at the apex, connate at the base, 3 mm. long. *Stamens* 2 mm. long adnate to the corolla tube; filaments filiform, white, anthers dark, ovate. *Carpels* nearly as long as the stamens, ovaries oblong, narrowing suddenly into the style which is about half as long; stigma minute, capitate. *Squamae* small, yellow, broader than long, emarginate.

Hab. Cape Province. Laingsburg Division: Ngaap Kop. 4,000 ft., *Compton* 14416 (*Type*, in the Nat. Bot. Gdns. Herb.), 25 Feb., 1943; 14586, 10 June 1943 (fruiting). Prince Albert Division: Prince Albert, *Krige* and *Tugwell*, Nat. Bot. Gdns. No. 4556/14, (in Bolus Herb.), March 1915.

This plant seems best placed in the *Acutifolia* group. It is characterised by its divaricate habit, and the uniformity of the internodes, as even the upper ones below the inflorescence do not lengthen, giving the inflorescence a sessile appearance.

***Felicia stricta* Compton.** (Compositae—Asteroideae—Heterochromeae)

Fruticulus angustus, erectus vel expansus. *Caules* rigidi, foliati, supra subpedunculoidei, in capitulis solitariis terminantes. *Folia* simplicia linearia, erecta, base subamplexicaulia, dorso convexa, acuta, glabra, marginibus breviter ciliatis. *Capitulum* erectum, campanulatum. *Involucri bracteae* 3-seriatae, oblongo-lanceolatae, coriaceae, glabrae, marginibus scariosis, ciliatis. *Flosculi radii* c. 8, ligulati, caerulei, feminei; *disci* tubulati, flavi, hermaphroditi; omnes fertiles. *Achaenia* plana, glabra. *Pappi setae* uniseriatae, rigidae, barbellato-plumosae.

A small erect or straggling shrub. Stems slender, rather rigid, terete, sparsely pilose above, where it becomes pedunculoid with smaller and more distant leaves and terminates in a solitary capitulum. Leaves alternate, imbricate below, semiamplexicaul, erect, appressed or slightly incurved, linear, round-backed, acute, apiculate, glabrous, the margins shortly ciliate, about 6 mm. long \times 0.6 mm. wide. Capitulum erect, 6—7 mm. long, campanulate, about 2 cm. diam. when expanded. Bracts 3-seriate, of unequal length, oblong, lanceolate, coriaceous, glabrous with transparent white-ciliate margins. Ray florets c. 8, ligulate, ♀, blue. Disc florets yellow, ♂, the corolla tubular, narrowly obconical. All florets fertile. Achenes c. 2 mm. long, flattened, glabrous, slightly transversely ridged. Pappus uniseriate, of about 18 stiff hairs, c. 4 mm. long, barbellate-plumose.

Hab. Cape Province. Worcester Division: Rabiesberg, south slopes, 600 m. alt., 26 September 1935, *Compton* 5838 (*Type* in Herb. National

Botanic Gardens): Doorn River Valley, *Leipoldt*. Paarl Division: Wemmershoek, 29 August 1937, *B. Martin* and *F. W. Thorns*.

The general appearance of this plant is rather that of a shrubby "Mairea", but the pappus bristles (on which the distinction of the genus *Mairea* chiefly depends) are intermediate in plumosity between those of typical *Felicias* and typical "Maireas". As mentioned in *Trans. Roy. Soc. S. Africa*, XIX, 312, 1931. I prefer to regard all the shrubby "Maireas" as belonging to the genus *Felicia*, leaving only those species in *Mairea* which have a scapose or subscapose inflorescence and leaves mainly radical or basal. This new species is therefore included in *Felicia*.

Helichrysum interzonale Compton. (Compositae—Inuloideae—Helichryseae).

§ *Aptera*.

Fruticulus laxus. *Caules* angusti, lanati. *Folia* parva, linearia, marginibus reflexis, infra lanata, supra glabrata, rugosa. *Capitula* pauca, in corymbis parvis disposita, breviter pedunculata, cylindrica vel sub-turbinate, squamis lanatis, glanduligeris, late scarioso-marginatis, suberectis, obtusis vel subacutis. *Flosculi* c. 25—30, hermaphroditi. *Receptaculum* planum, paleis parvis, triangularibus. *Pappi setae* tenues, minute barbellatae. *Achaenia* glabra.

A slender straggling shrub, little branched except after injury. Stems terete, densely white-lanate. Leaves numerous, linear, broad-based, erect or spreading, 5—8 mm. long \times 1 mm. wide, obtuse or slightly recurved-mucronulate, the margins strongly reflexed and almost covering the lower surface which is densely lanate, the upper surface glabrate, rugose or sub-bullate. Capitula erect, 2—7 shortly pedunculate in a sub-corymbose cluster at the end of the branch, c. 6 mm. long \times 6 mm. diam., cylindrical or sub-turbinate, obtuse at base: outer involucreal scales woolly with a broad brown scarious sub-erect obtuse margin, the inner scales with an oblong claw bearing numerous short glands and a scarious slightly spreading spatulate sub-acute apex. Florets c. 25—30, all hermaphrodite, about 3 mm. long, tubular at base, narrowly funnel-shaped above, the segments short and bearing a few glands. Pappus hairs few, slender and soft, minutely barbellate. Achenes glabrous. Receptacle flat bearing short triangular erect tooth-like scales.

Hab. Cape Province. Laingsburg Division: Witteberg near Bantams, 1,500 m. alt., 27 October, 1941, *Compton* 12164 (*Type*, in Herb. National Botanic Gardens); Witteberg near Whitehill, 1,500 m. alt., 21 October, 1942, *Compton* 13967; 1,300 m. alt., 23 October, 1939, *Compton* 7991; 10 November 1935, *Compton* 5885. Ladismith Division: Wittepoort, 700 m. alt., 12 September 1938, *Compton* 7867. Willowmore Division:

Georgida, lower slopes of Suurberg, October 1930, *Fourcade* 4402; Slypsteenberg, 3 November, 1941, *Esterhuysen* 6276.

This new *Helichrysum* is distributed over a fairly wide area on the slopes of relatively arid quartzite mountains with a "Cape" flora bordering the Karoo. (The Willowmore locality is about 165 miles from the Bantams locality). Its nearest affinity is with *H. Dregeanum* Sond.



FIG. 4. *Helichrysum interzonale*. 1. Plant, nat. size. 2. Stem and leaves $\times 5$. 3. L.S. Capitulum $\times 6$. 4. Inner involucre bract $\times 8$. 5. Outer involucre bract $\times 8$. 6. Disc floret $\times 8$. 7. Disc floret with pappus removed $\times 8$. 8. Stamens $\times 10$. 9. Style $\times 10$. 10. Upper portion of pappus bristle $\times 25$. (*Compton* 12164.) Del. E. Wasserfall.

and Harv. (from the Stormberg and the Witteberg in the Albert Division), from which it differs in its larger capitula with more numerous florets, pilose involucre bracts and generally smaller leaves. It also bears some affinity to *H. revolutum* Less. (which also occurs in the Whitehill district, e.g. *Compton* 2709, 12177), from which it differs in its larger and less numerous capitula, its less obtuse involucre scales and its shorter and less woolly leaves.

LYSICHLAMYS Compton, gen. nov. (Compositae—Senecionideae—Othonneae.)

Frutices lignosi, glabri, foliis alternis, parvis, integris. *Capitula* axillaria, pedunculata, heterogama, radiata, floribus radii ♀ discique ♂ fertilibus. *Involucri bracteae* liberae, plus minusve biseriatae. *Receptaculum* convexum, paleis brevibus. *Corollae* flavae, ♀ ligulatae, patentae; ♂ tubulosae, limbo campanulato. *Antherae* basi integrae. *Achaenia* ovoidea, pubescentia. *Pappi setae* paucae, tenues, inaequales, barbelatae, caducissimae.

Closely allied to *Euryops* and *Thodaya*, but distinguished by the sub-biseriate involucre bracts, which overlap one another and are free to the base. This condition is approached in some species of *Euryops* with lobed leaves (e.g. *E. Dregeanus* Sch. Bip. and *E. abrotanifolius* DC.) The new genus as at present constituted consists of two species, of which one, *Lysichlamys Muirii*, was originally described as a species of *Euryops*, *E. Muirii* C. A. Smith. The author writes that this plant "differs from published generic descriptions of *Euryops* in that the involucre bracts are not truly in one row, and are distinctly connate at the base only, but in all other characters it agrees with *Euryops* so closely that I have decided to place it in this genus." Dr. J. Hutchinson, however, commenting on the type specimen (*Muir* 2453, Hills at Melk-houtfontein, near Still Bay, alt. 600 ft., Sept., 1920—in Herb. Bolus) considers that it belongs to no known genus, and with this judgment I am inclined to agree. It shows close agreement in essential characters with the new species described hereunder, *Lysichlamys erecta*, which I choose as the type-species of the new genus. The accompanying drawings of the two species illustrate their congeneric similarity.

***Lysichlamys erecta* Compton.**

Fruticulus erectus, glaber. *Caules* teretes. *Folia* multa, densa, erecto-patentia, linearia, apiculata. *Pedunculi* elongati in axillis superioribus erecto-patentes, laeves. *Capitulum* hemisphaericum. *Involucri bracteae* distinctae, subbiseriatae, basi leviter gibbosae, obovatae et oblanceolatae, subcarinatae. *Flosculi* flavi, radii ligulati, ♀, disci tubulosi, limbo campanulato, ♂, omnes fertiles. *Antherae* exappendiculatae. *Achaenia* ovoidea, puberula. *Pappi setae* paucae, inaequales, flexuosae, barbelatae, caducissimae. *Receptaculum* convexum, squamis brevibus, obtusis.

A small erect virgate shrub, glabrous throughout. Stems terete, rough with numerous leaf-scars. Leaves many, evenly and closely distributed on the stem, erecto-patent, linear, slightly keeled, apiculate, 6–8 mm. long × 0.7 mm. wide. Peduncles erecto-patent in the axils of the upper leaves, slender, light coloured, about 2 cm. long, bearing

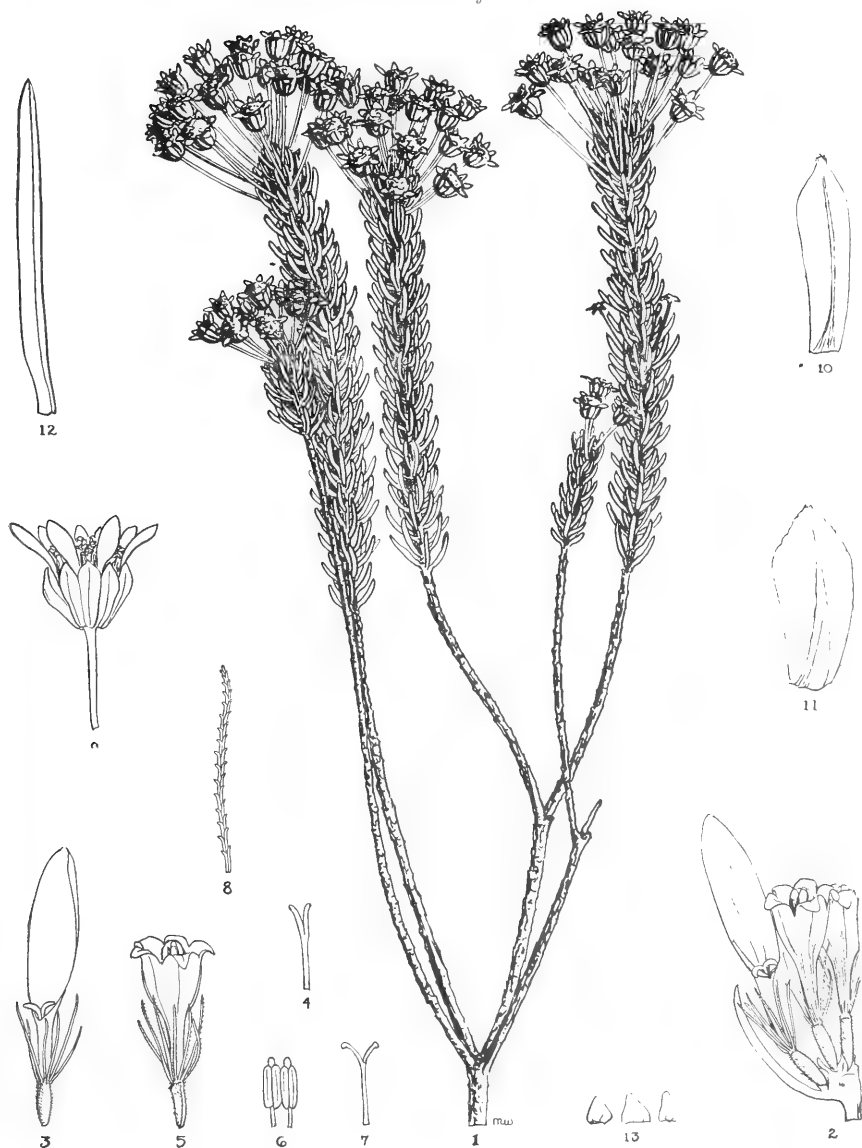


FIG. 5. *Lysichlamys erecta*. 1. Portion of plant, nat. size. 2. L.S. Capitulum $\times 8$. 3. Ray floret $\times 8$. 4. Stigma of ray floret $\times 8$. 5. Disc floret $\times 8$. 6. Stamens of ray floret $\times 8$. 7. Stigma of disc floret $\times 8$. 8. Bristle of pappus $\times 20$. 9. Capitulum $\times 3$. 10, 11. Involucral scales $\times 8$. 12. Leaf $\times 5$. 13. Scales from receptacle $\times 16$. (Compton 7977.) Del. M. Walgate.

the capitula in a convex corymb. Capitulum erect, the involucre \pm hemispherical, 4—5 mm. diam., of about 10 distinct bracts which overlap one another in two series, coriaceous, obovate and oblanceolate, acute, slightly gibbous at the base, sub-carinate. Ray florets c. 8, ligulate, ♀, yellow, c. 5 mm. long : disc florets numerous, tubular, the limb campanulate, ♂, yellow, c. 4. mm. long ; all florets fertile. Achenes ovoid, pubescent. Pappus of a few unequal, flexuous, barbellate, white, very caducous hairs. Anthers without appendages. Receptacle convex, bearing short obtuse triangular scales between the florets.

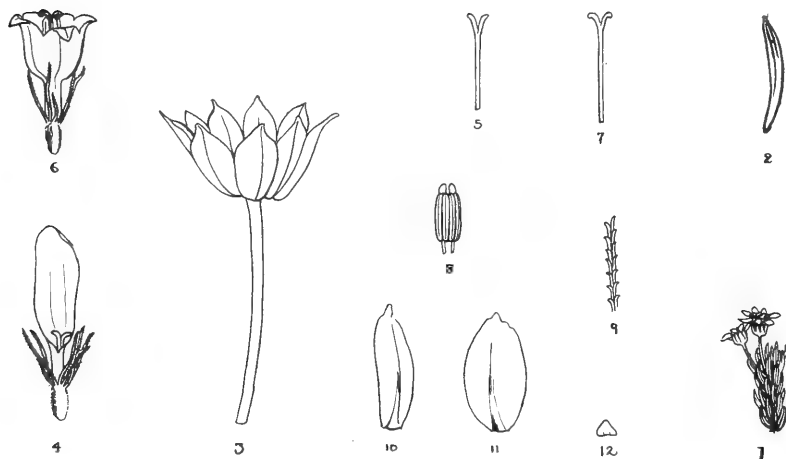


FIG. 6. *Lysichlamys Muirii*. 1. Fragment of plant, nat. size. 2. Leaf \times 6. 3. Involucre \times 8. 4. Ray floret \times 8. 5. Stigma of ray floret \times 8. 6. Disc floret \times 8. 7. Stigma of disc floret \times 8. 9. Portion of pappus bristle \times 20. 10, 11. Involucral scales \times 8. 12. Scale from receptacle \times 20. (Muir 2453.) Del. M. Walgate.

Hab. Cape Province. Laingsburg Division : Witteberg, near Whitehill, 1,500 m. alt., north slopes, 23 October, 1939, *Compton* 7977 (*Type*, in Herb. National Botanic Gardens) ; same locality, 21 October 1942, *Compton* 13969.

Lysichlamys Muirii (C. A. Smith) *Compton* nov. comb., = *Euryops Muirii* C. A. Smith in *Bothalia*, II, p. 360, 1927.

Senecio graminicolus C. A. Smith.

§ *Glaberrimi* DC.

|| *S. retrorso* DC. et *S. scelerato* Schweick. affinis, sed a primo foliis



PLATE III.

1. *Senecio pauciligulatus*.

2. *Senecio hygrophilus*.

3. *Senecio graminicolus*.

4. *Senecio exuberans*.

oblongo-ellipticis ad late ovato-oblongis basibus late amplexicaulibus et cordatis, et a secundo longo-acuminatis foliorum apicibus facile distinguiter.

Planta herba, ad 45 cm. alta, in omnibus partibus perglauca. *Radix* rhizomata, perennis, incrassato-lignosa, in corona dense lanata pilis sericeis (more sectionis). *Folia* oblongo-elliptica ad late ovato-oblonga, prominenter ad apicem attenuata et acuminata, cordata et amplexicaulia, eis ad pedem caulis basin attenuatis, ad 15 cm. longa et 4 cm. lata, subcarnosa, coriacea et brunnea ad ferruginea in exsiccatis, marginibus cartilagineis et paucis dentibus obtusis saepe onusta, glabra. *Inflorescentia* corymbosa, laxa, ad 45 cm. diam., ramis primariis ex axillis foliorum ad apicem caulis, omnino glabra; ramulis ultimis gracilimis strictis et paucis squamis minutis onustis. *Involucrum* obconicum. *Capitula* radiata, floribus omnibus luteis. *Achenia* glabra.

Plants growing socially in loose clumps of up to 40 (or more) individuals, or, more generally, solitary, up to 45 cm. high, markedly glaucous in all parts. *Rootstock* a thickened woody perennial rhizome, densely woolly-hairy at the crown, the hairs tufted and curly. *Stems* annual, rigidly erect, often subflexuous, simple in the lower third, or half, and then branching into the inflorescence, rib-striate and angled from the decurrent leaf bases, glabrous. *Leaves* oblong-elliptic to broadly ovate-oblong, markedly tapering to the acute apex, cordate and amplexicaul, the lowermost narrowed to the clasping base, up to 15 cm. long and 4 cm. wide, sub-fleshy, very generally with small irregular bluntish teeth arising out of the narrow pale cartilaginous but otherwise entire margin, leathery and brown to rusty-red in the dried state with nerves prominent only on the lower surface, glabrous. *Inflorescence* corymbose and lax, up to 45 cm. in diam., the primary branches from the axils of the reduced upper cauline leaves, glabrous in all parts; ultimate branchlets very slender, straight, with a few sparse minute scales. *Involucre* obconic. *Heads* radiate, with all the flowers yellow. *Achenes* glabrous. (Plate III, Fig. 3.)

Hab. Natal Province. Richmond Division, along right bank of a small stream on the farm "Blackwood," November, 1941, C. A. Smith 7000 (*Type*, in Nat. Herb., Pretoria); about $\frac{3}{4}$ mile from Thornville Junction, alongside the Richmond road, on burnt veld, October, 1942, C. A. Smith, 7082!; et eod. loc., November, 1941, R. A. Dyer 4279!

Senecio hygrophilus R. A. Dyer and C. A. Smith.

§ *Plantaginei* Harv.

|| *S. adnato** DC. affinis, sed foliis plerumque multo latioribus

* Harvey (Fl. Cap. III, 349: 1864-65) places *S. adnatus* DC. erroneously in his § *Paucifolii*.

oblongo-ellipticis, marginibus inaequaliter et profunde incisus etiamque inflorescente fastigiata facile distinguitur.

Planta herba, robusta, erecta, ad basin suffrutescens et 2 cm. crassa, ad 180 cm. alta, ad rhizomam in hieme perirens, omnino glabra et glauca. *Radix* rhizomata, magne incrassato-lignosa, perennis. *Caulis* rigidus, saepe robustus, plus minusve rectus, prominenter costato-striatus vel angulatus a foliorum basibus decurrentibus, foliosus. *Folia* oblongo-elliptica vel oblonga, nonnumquam ad basin longe-cuneata, apicis acutis, ad 15 cm. longa et 7.5 cm. lata, sub-carnosa, coriacea in exsiccatis et brunnea, marginibus grosse et irregulariter dentatis (serrato-dentatis), saepe integris, in caulibus breviter et inaequaliter decurrentes; foliis inferioribus oblongo-cuneatis minoribus et saepe exsiccatis et caducis. *Inflorescentia* fastigiata, corymboso-paniculata, ad 30 cm. diam. *Capitula* numerosa vel pauca, radiata, c. 10-flora. *Involucrum* anguste cylindricum, bracteae 5, planis et chartaceis. *Flores* radii 1—2 (raro 3); ligulae loratae, ad 1 cm. longae, aureo-flavae, patentes. *Flores disci* plus minusve 8, flavi. *Achenia* in omnibus floribus glabra.

Plant an erect herb up to 1.8 m. high, the aerial parts annual, generally growing socially on damp slopes or in vleis and riparian localities, glaucous and glabrous in all parts. *Rootstock* much thickened, woody, perennial, rhizomatous, with numerous wiry spreading roots forming a dense mass in the soil. *Stem* rigid, generally straight, robust, especially in the taller specimens and then up to 2 cm. basal diameter, markedly rib-striate and angled by the decurrent leaf bases, generally leafy in the lower two-thirds only, or the upper leaves much reduced, sometimes with the lower third bare due to drying off of the older leaves through shading, etc. *Leaves*: *radical* none; *cauline* oblong to oblong-elliptic, up to 15 cm. long and 7.5 cm. wide, the lowermost much smaller, markedly long-cuneate to the base (and particularly so in the "off-season" on barren shoots), acute at the apex, sub-fleshy and generally flaccid, markedly glaucous, coriaceous and brittle when dry and then brown, with fairly conspicuous lateral nerves which are more prominent on the lower surface; margins often entire, more generally distantly and more or less irregularly and coarsely serrato-dentate, or with short callous-tipped and blunt teeth; base of the leaves broadly stem-clasping and unequally decurrent on either side of the stem in the form of wide but short wings. *Inflorescence* fastigiate, very seldom open, showy and handsome, corymboso-paniculate or corymboso in fruit and up to 30 cm. in diameter; branches more or less flexuous and arising from the axils of the upper much-reduced (bracteal) leaves. *Heads* few to numerous, radiate, about 10-flowered, erect. *Involucre* narrowly cylindric and composed of usually 5 flat and chartaceous scales up to 1.5 cm. long. *Ray*

florets 1—2 (seldom 3), strap-shaped, up to 1 cm. long, bright golden-yellow. *Disc florets* about 8, yellow. *Achenes* glabrous in all florets. (Plate III, Fig. 2.)

Hab. Natal Province. Pietermaritzburg Division: Duncairn Siding, near Hilton, Nov. 1939, C. A. Smith 7500! (*Type*, in Nat. Herb., Pretoria), et eod. loc. January 1940, R. A. Dyer 4117!

Senecio pauciligulatus R. A. Dyer and C. A. Smith.

§ *Plantaginei* Harv.

|| *S. adnato* DC. affinis, sed foliorum marginibus dentatis et inflorescentia fastigiata facile distinguitur.

Planta herba, erecta, ad 80 cm. alta, ad rhizomam in hieme perirens, saepe numerosa et area magna tecta ob causa ex stolonibus subterraneis abunde proliferata. *Rhizoma* multe incrassata, lignosa, radicibus lateralibus numerosis gracillibus patentibus. *Caulis* simplex, rigidus, flexuosus vel rectus, laxa ad apicem foliosus, prominenter angulatus. *Folia* simplices, lanceolata ad lanceolato-elliptica, superne amplexicaulia et breviter decurrentes, inferne angustissima ad basin sicut late petiolata, ad apicem attenuata, ad 18 cm. longa et 2 cm. lata, perglauca, subcarnosa, flaccida et fragiles, marginibus subrevolutis, dentibus plus minusve regulariter positis, rarissime integris. *Inflorescentia* laxa paniculato-corymbosa, fastigiata, ramis ultimis gracillimis. *Capitula* radiata, plus minusve 7—9-flora. *Involucrum* anguste cylindricum; squamae plus minusve 5, membranaceae (in exsiccatis), ad 1 cm. longae, apice obtusae. *Flores* radii 1—3 (saepissime 1 vel 2); lamina lutea ligulata. *Flores disci* lutei. *Achenia* glabra.

Plant an erect herb up to 80 cm. high, with annual aerial parts, often forming dense masses by vegetative proliferation from underground runners, glabrous and glaucous in all parts. *Rootstock* a much-thickened woody rhizome, with numerous tough and wiry spreading lateral roots. *Stems* simple, rigid, sometimes flexuous but generally straight, laxly leafy up to the inflorescence branches, prominently angled by the decurrent midribs of the leaves. *Leaves* entire, lanceolate to lance-elliptic, the upper stem-clasping and adnate as a very short stem-wing, the lower much narrowed and long-tapering to the base (thus appearing broadly petioled), long-tapering to the acute apex, up to 18 cm. long and 2.0 cm. wide, gradually smaller toward the inflorescence branches, markedly glaucous, sub-fleshy and flaccid in the fresh state and then rather fragile, the margins subrevolute with a number of small acute more or less regularly spaced teeth, very seldom without and then only sporadically so. *Inflorescence* a laxly fastigiata corymbose panicle, with the ultimate

branches very slender. *Heads* radiate, about 7—9-flowered. *Involucre* narrowly cylindric; scales about 5, membranous in the dried state, up to 1 cm. long, obtuse at the apex. *Ray florets* 1—3 (very generally one or two), with a long narrow strap-shaped yellow ligule. *Disc florets* yellow. *Achenes* glabrous. (Plate III, fig. 1).

Hab. Natal Province. Pietermaritzburg Division: Duncairn Siding, near Hilton, Nov., 1941, C. A. Smith 7015 (*Type*, in Nat. Herb., Pretoria), R. A. Dyer 4121!

Senecio exuberans R. A. Dyer (§ Plantaginei Harv.), *S. albanense* DC. affinis, sed marginibus callosso-incrassatis crispulato-dentatis foliorum et capitulis discoideis in fructu ovoideis et nutantibus facile distinguitur.

Radix perennis, rhizomata, multe incrassata et lignoso-tuberosa (in siccis crasso-lignosa), segmentis constrictis, in corona dense setis (reliquis foliorum) onustis, radicibus lateralibus numerosis tenuibus. *Caulis* simplex, rigidus, rectus, ad 1·5 m. altus, angulatus vel a foliorum basibus decurrentibus costato-striatus, albo-tomentosus, tomento deinde lacerato vel sicut abbraso et deciduo. *Folio radices* oblonga, ad 15 cm. longa (petiolum inclusa), ad 1·5 cm. lata, ad apicem obtusum longe attenuata, raro subacuminata, in basin longe attenuata, in vivo subcoriacea (valde in exsiccatis), viridia, superne nitentes, inferne prominenter reticulato-nervosa et nervo medio in carina incrassata valde elevata, glabra; margines cartilaginei, saepe callosso-incrassati tum crispulato-dentati. *Folio caulis* lineari-lanceolata, vel sublanceolata, ad 20·5 cm. longa (petiolum inclusa) et 8 mm. lata, longe peracuminatis, apice acuta, insensim in petiolo gracile ad 6 cm. longo cuneata, glabra; ea ad apicem caulis lineari-acuminata vel longe acuminata et tenuiter lanato-tomentosa, glabrescentia, caracteis aliis ut in folio radices. *Inflorescentia* racemoso-subpaniculata, ad 25-capitata; rami simplices vel 1-ramosi ex axillis bractearum valde reductarum acuminatarum, patentes sed in fructu recurvi et elongati, tomentosi, glabrescentes, bracteolis valde reductis dispersis onustis. *Capitula* discoidea, ad 50-flora, floribus luteis. *Involucrum* cylindrico-campanulatum, in fructu ovoideum et nutans, prominenter calyculatum; squamae oblongae, acuminatae, marginibus scariosae, laxe lanato-tomentosae vel glabrescentes; bractee calyculi 2—5-seriatae, ovatae vel oblongae, in medio incrassatae, marginibus scariosis minute glanduloso-dentatis, acutae vel obtusae, tenuiter tomentosae. *Achenia* costata, nitida, glabra.

Rootstock perennial, rhizomatous, much thickened and woody-tuberos (when fresh, woody when dry), constricted into segments, with numerous slender and wiry lateral roots, the crown invested by a close mass of bristles which are the remains of old leaf-bases. *Stem* simple

rigidly erect, rod-like and straight up to 1.5 m. high, angled or rib-striate from the decurrent leaf bases, white-tomentose from the base upwards, the toment at length peeling off in untidy pieces, or appearing as if rubbed off. *Leaves*: *Radical* oblong, up to 15 cm. long (including the petiole) and 1.5 cm. wide, gradually narrowing to the obtuse apex, seldom even sub-acuminate, long-cuneate to the base and tapering into a wiry and slender up to 6 cm. long petiole, sub-coriaceous (when fresh, markedly so when dry), green, shiny on the upper face, duller and very much more prominently reticulately nerved below and with the midrib raised into a "keel", glabrous, crispulate-undulate along the cartilaginous margins which are often callous thickened at more or less regular but close intervals and so crenulate-dentate: *Cauline* linear-lanceolate or lanceolate, up to 20.5 cm. long (including the petiole) and 8 mm. wide, long- and markedly-acuminate, acute at the apex, long-cuneate at the base and insensibly passing into the wiry and slender up to 6 cm. long petiole, glabrous, the uppermost linear-acuminate to acuminate and wiry, thinly woolly tomentose, glabrescent; otherwise similar to the radical leaves. *Inflorescence* racemose or subpaniculate, up to 25-headed; individual flowering branches simple or once-branched, up to 15 cm. long, elongating in fruit, arising from the axils of much-reduced acuminate bracts, locally woolly-tomentose, glabrescent, with a few scattered much-reduced acuminate bracteoles. *Capitula* discoid, up to 50-flowered, the florets yellow. *Involucre* cylindric-campanulate, erect, at length ovoid in fruit and then nodding, conspicuously calyced; scales oblong, acuminate, with scariose margins; calycle bracts 2—5-seriate, ovate or oblong, thickened along the middle, with scariose minutely glandular-dentate margins, acute to obtuse, generally finely cobwebby or woolly between the rows, or along the margins, glabrescent, the outermost much-reduced, sometimes spreading-incurved when the heads are in full flower. *Achenes* ribbed, shiny and glabrous. (Plate III, fig. 4).

Hab. Natal Province. Camperdown Division: Near Drummond, off the Durban-Pietermaritzburg main road, in sandy soil amongst grasses, January, 1941, *C. A. Smith* 6945S (*Type*, in Nat. Herb., Pretoria). Pietermaritzburg Division: Below "World's View", in grassy field, above Pietermaritzburg, January, 1941, *R. A. Dyer* 4116 (*Syn-type*, in Nat. Herb., Pretoria); amongst grasses, on annually burnt "sourveld" along roadside on a hill overlooking Chase Valley to N.E. of Allerton Veterinary Laboratories, January, 1942, *Philp, Sherry and Smith* 1!

A very well characterised plant in the field, particularly in the fruiting stages when the weight of the heads causes the plant to bend over, or the individual supporting inflorescence-branches to stand out or droop in a graceful manner thereby imparting to the plant an abandoned and

rather exuberant appearance, whence the specific epithet. This plant is one of the most characteristic features of the Midlands grassveld vegetation in December to January, its height making it prominent over the rest of the plants, and its lax racemose or sub-paniculate inflorescence (particularly when in fruit), rendering recognition a comparatively simple matter.

Berkheya lignosa Compton. (Compositae—Arctotideae—Gorterieae.)
§ Stobaea.

Frutex rigidus spinosissimus. *Caules* lanati. *Folia* densa, patentia, irregulariter pinnatisecta, lobis angustis, pungentibus, marginibus reflexis, mesonevris prominentibus, faciebus inferioribus lanatis, superioribus glabrescentibus. *Inflorescentia* paniculata, capitulis 1 vel paucis in pedunculis axillaribus. *Involucrum* bracteis exterioribus deflexis, interioribus erectis, spinoso-ciliatis. *Flosculi* flavi, *radii* ligulati, steriles, pauci vel nulli, *disci* tubulati, hermaphroditi. *Receptaculum* planum, paleis parvis, acutis. *Achaenia* obconica, angulata, leviter tomentosa. *Pappus* biseriatus, squamis exterioribus obtusis, interioribus bilobatis.

A stout rigid densely branched very prickly shrub, reaching about 120 cm. high, with old stems up to 10 cm. diam. Young stems densely woolly. Leaves closely set, spreading, their lobes interlacing, pinnatisect with additional shorter lobes, the segments set at irregular angles, linear, tapering to long pungent spines, the margins reflexed, the midribs very prominent above and below, the lower surface woolly, the upper surface glabrescent. Flowering shoots terminal, paniculate, up to about 20 cm. long, the main axis with internodes more elongated than those of the stems, thinly lanate-pubescent, bearing smaller spreading or deflexed leaves which are shortly decurrent in spinose wings and in whose axils are 1- or few-flowered lateral inflorescences. Ultimate peduncles erecto-patent, about 2 cm. long. Capitulum up to 4 cm. total diameter. Involucral bracts concrescent at base, the outer ones leaf-like but smaller, spreading and deflexed, the inner ones erect, closely spinose-ciliate, equalling the disc florets. Ray florets few (absent in some capitula), yellow, ligulate, not exceeding the disc florets, sterile, with staminodes in the tube. Disc florets numerous, yellow, tubular, c. 7 mm. long, scabridulous, the lobes obtuse, erect or inflexed. Achenes obconical, angled and striate, glabrous except for a few short hairs, 2 mm. long, the pappus c. 0.5 mm. long, biseriate, the outer scales oblong or obovate, obtuse, the inner scales narrower and bifid. Receptacle flat, with small erect ovate paleae with acute lacinate apices.

Hab. Cape Province. Laingsburg Division: Ngaap Kop, south slope, 1,200 m. alt., at foot of kranses, 1 December, 1941 (in flower),

Compton 12614 (Type, in Herb. National Botanic Gardens); same locality, 25 February, 1943 (in fruit), *Compton 14430*.

This striking species is only known so far in one limited locality.

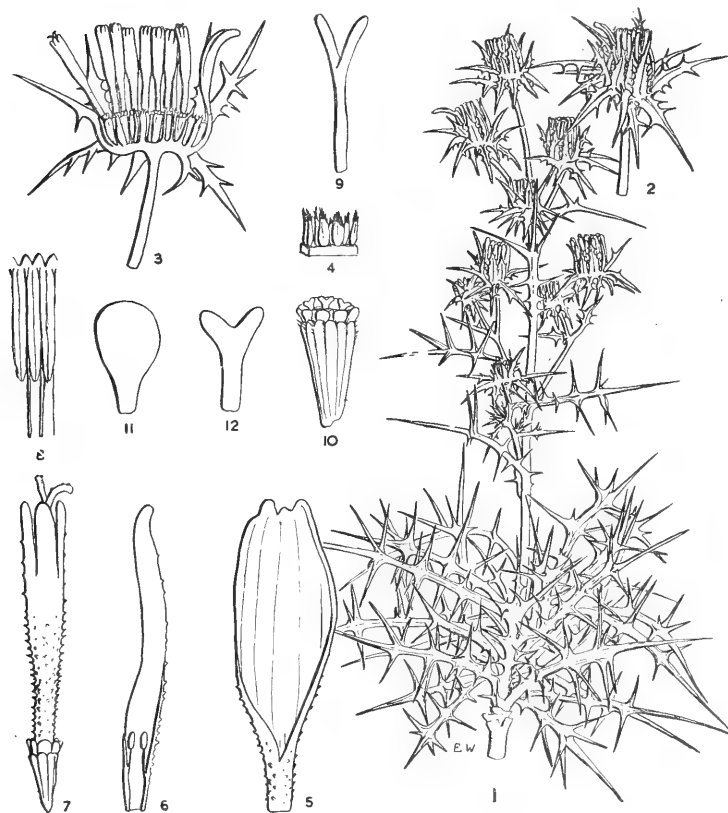


FIG. 7. *Berkheya lignosa*. 1. Portion of plant $\times \frac{1}{2}$. 2. Capitulum, nat. size. 3. L.S. Capitulum $\times 2$. 4. Receptacle with paleae $\times 2$. 5. Ray floret $\times 5$. 6. Ray floret cut in half $\times 5$. 7. Disc floret $\times 5$. 8. Stamens $\times 5$. 9. Style $\times 5$. 10. Fruit $\times 8$. 11. Outer pappus scale $\times 70$. 12. Inner pappus scale $\times 70$. (*Compton 12614*.) Del. E. Wasserfall.

The stout woody stems, the interlacing branches and leaves and the needle-pointed stiff spines set at all angles make it a formidable object. The occurrence of a few functionless ligulate ray florets in some capitula is unusual, the capitula being to all appearance discoid.

Erica Beatricis Compton. (Ericaceae—Ericoideae.)

§ Didymanthera.

Fruticulus erectus, ramosus. *Caules* pubescentes. *Folia* imbricata, 4-nata, lineari-lanceolata, subtus setoso-hispida. *Flores* terminales, 4-nata, plus minusve cernui. *Pedicellus*, *bractae* et *sepala* dense griseo-setoso-hispidi. *Corolla* oblonga, glabra, alba. *Antherae* exsertae, fuscae, minute aristatae. *Ovarium* hispidulum, stigmate breviter exserto, truncato.

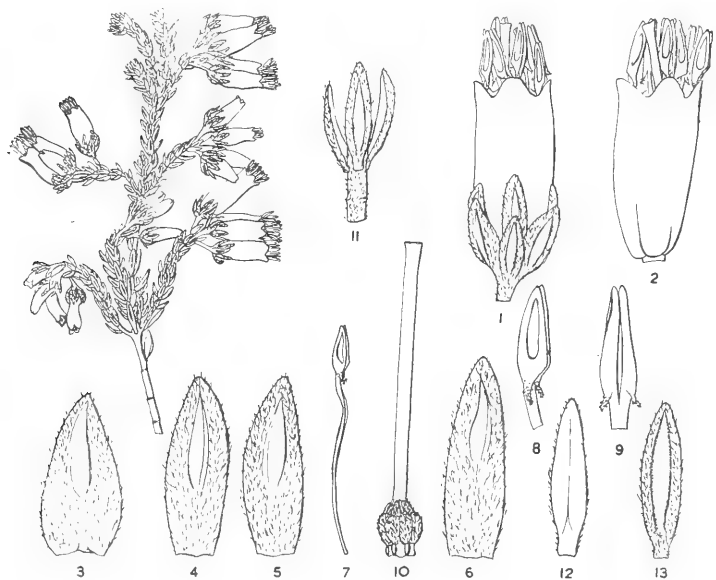


FIG. 8. *Erica Beatricis*. Portion of plant, nat. size. 1. Flower $\times 3$. 2. Corolla $\times 3$. 3, 4, 5. Bracts $\times 6$. 6. Sepal $\times 6$. 7. Stamen $\times 3$. 8. Anther, side view $\times 6$. 9. Anther, back view $\times 6$. 10. Gynaecium $\times 4$. 11. Whorl of young leaves $\times 4$. 12. Old leaf, front view $\times 4$. 13. Old leaf, back view $\times 4$. (Bond 892.) Del. L. R. van Niekerk.

A small erect much-branched shrub. Stems grey-pubescent. Leaves imbricate, 4-nate, sub-erect, linear-lanceolate, sulcate or sub-open-backed, minutely puberulous on the upper and half-enclosed lower surfaces, setoso-hispid on the reflexed margins, c. 4–6 mm. long \times 1 mm. wide. Flowering branches lateral, one or two cm. long, spreading or cernuous, the flowers terminal, mostly 4-nate. Pedicels c. 4 mm. long. Bracts rigid, appressed, 3–4 mm. long. Sepals narrow-lanceolate,

appressed, rigid, sulcate, 5 mm. long. Pedicels, bracts and sepals all densely grey-setose-hispid. Corolla glabrous, white, oblong, not inflated, the tube c. 8 mm. long \times 3 mm. wide, the lobes erect, deltoid, obtuse, 1 mm. long. Filaments slender, c. 9 mm. long. Anthers exserted, brown, c. 2 mm. long, slightly broadened near the base, narrowing to an obtuse apex, the pore about $\frac{2}{3}$ as long as the cell, with a pair of minute hispidu-

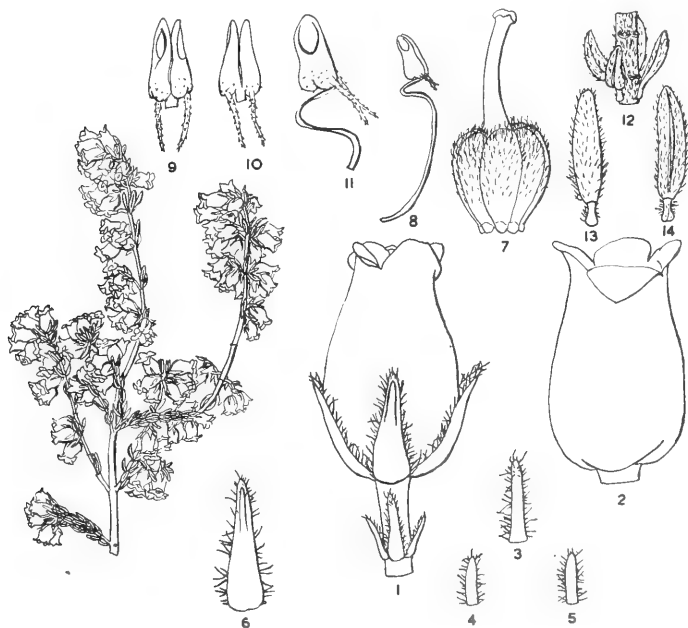


FIG. 9. *Erica parviflora* var. *glabra*. Portion of plant, nat. size. 1. Flower \times 10. 2. Corolla \times 10. 3, 4, 5. Bracts \times 10. 6. Sepal \times 10. 7. Gynaecium \times 10. 8. Stamen \times 10. 9. Anther, front view \times 20. 10. Anther, back view \times 20. 11. Anther, side view \times 20. 12. Leaf, front view \times 20. 13. Leaf, back view \times 5. 14. Whorl of leaves \times 5. (Compton 6647.) Del. L. R. van Niekerk.

lous forward and outward directed aristae slightly adnate to the filament. Ovary sessile, hispidulous, the style glabrous, shortly exserted, the stigma truncate.

Hab. Cape Province. Uniondale Division: Helpmekaar (or Thumb) Peak, north aspect, 1,300 m. alt., 8 January, 1941, Bond 892 (*Type*, in Herb. National Botanic Gardens).

A remarkable species, not closely related to any other and not fitting well into any recognised section of the genus. Rather than create a

new section, however, I have placed it in § *Didymanthera*, from which, nevertheless, it differs in the hairy bracts, sepals and ovary and the 4-nate flowers. It shows some resemblance to § *Dasyanthes*, but differs therefrom in its glabrous corolla, in having the flowers normally 4-nate and in the well-exserted anthers. I name it, with Miss Bond's concurrence, in honour of the distinguished educationalist Mrs. Beatrice Ensor, the owner of the estate on which it was found, whose hospitality and assistance have made it possible to collect in this interesting area and to discover this and other striking new species. (Her late husband's name is commemorated by *Stoebe Ensorii* Compton.)

***Erica parviflora* L., var. *glabra* Compton.**

§ *Ephebus*.

E. parviflorae varietas, corolla glabra, faucibus parum contractis, ore expanso, sepalis scariosis marginibus ciliatis, bracteis una foliacea alteris minutis, setis brevibus rigidis in bracteis, sepalis ovarioque, distincta.

A variety of *E. parviflora* L. distinguished by its glabrous corolla with slightly contracted throat and expanded mouth, its scariosus sepals with ciliate margins, its one leaf-like and two minute bracts, and by the short stiff bristles on the bracts, sepals and ovary.

Hab. Cape Province. Clanwilliam Division: Elands Kloof, *Compton* 6647 (*Type*, in Herb. National Botanic Gardens), 6646, 25 September 1936.

The glabrous corolla is remarkable in this species, and indeed in the § *Ephebus*, but the relationship with *E. parviflora* is clear. Perhaps the plant is deserving of specific rank.

***Erica tradouwensis* Compton.**

§ *Ephebus*.

Fruticulus erectus, ubique pubescentia grisea semi-glandulosa indutus. *Folia* 3—4-nata, patentia, dorso subaperto, lanceolata, obtusa. *Flores* terminales, 3—8 aggregati. *Bracteae* parvae, remotae. *Sepala* foliacea. *Corolla* ovoideo-urceolata, pubescens, segmentis brevibus. *Antherae* plerumque muticae, exsertae. *Ovarium* molliter pilosum, stigmatibus exserto, truncato.

An erect shrub with spreading branches. Stems, leaves, pedicels, bracts and sepals covered with a grey semi-glandular pubescence. Leaves 4-nate on strong shoots, 3-nate on weaker ones, patent, narrow-lanceolate, sub-open-backed, 4—7 mm. long × 1 mm. wide, obtuse. Flowers in small loose terminal clusters of 3—8. Pedicels slender, c. 5 mm. long. Bracts minute, remote. Sepals lanceolate, obtuse, sulcate, 2 mm. long

$\times 0.7$ mm. wide. Corolla ovoid-urceolate, pubescent, 3.5 mm. long $\times 3$ mm. diam., the lobes short, broad, obtuse. Filaments slender, 3 mm. long. Anthers exserted, 1 mm. long, brown, scabridulous, muticous or very minutely awned. Ovary sessile, softly pilose, the style 4 mm. long, the stigma exserted, truncate.

Hab. Cape Province. Swellendam Division: Tradouw Pass, 25

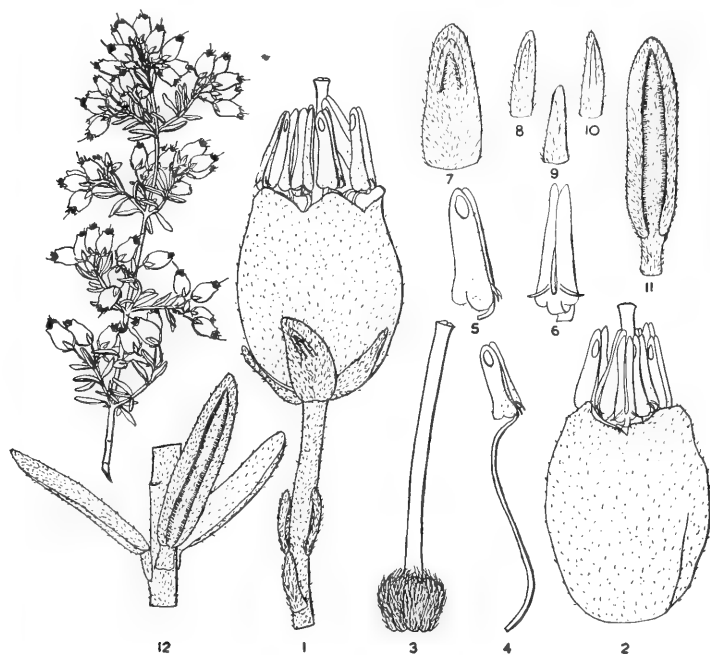


FIG. 10. *Erica tradouwensis*. Portion of plant, nat. size. 1. Flower $\times 8$. 2. Corolla $\times 8$. 3. Gynaecium $\times 8$. 4. Stamen, side view $\times 8$. 5. Anther, side view $\times 12$. 6. Anther, back view $\times 12$. 7. Sepal $\times 12$. 8, 9, 10. Bracts $\times 12$. 11. Leaf $\times 6$. 12. Whorl of leaves $\times 6$. (Compton 8590.) Del. L. R. van Niekerk.

March, 1940, Compton 8590 (*Type*, in Herb. National Botanic Gardens) ; 28 May, 1935, L. E. Taylor 393 ; 29 May 1935, L. E. Taylor 428.

Nearest *E. globosa* Andr. but differing in the smaller size of the flowers and their parts, the smaller leaves and the muticous or almost muticous anthers. It also shows much affinity with *E. deliciosa* Wendl. fil. in the § Pyronium, and might with almost equal justice be placed in that section.

***Erica pseudocalycina* Compton.**§ *Eurystoma*.

Fruticulus angustus, erectus. *Caules* puberuli. *Folia* 3-nata, erecta, lineari-lanceolata, sulcata, glabra. *Flores* 3-nati, terminales, subcernui, pedicellati. *Bractee* subapproximatae, glabrae, albae. *Sepala* ovato-

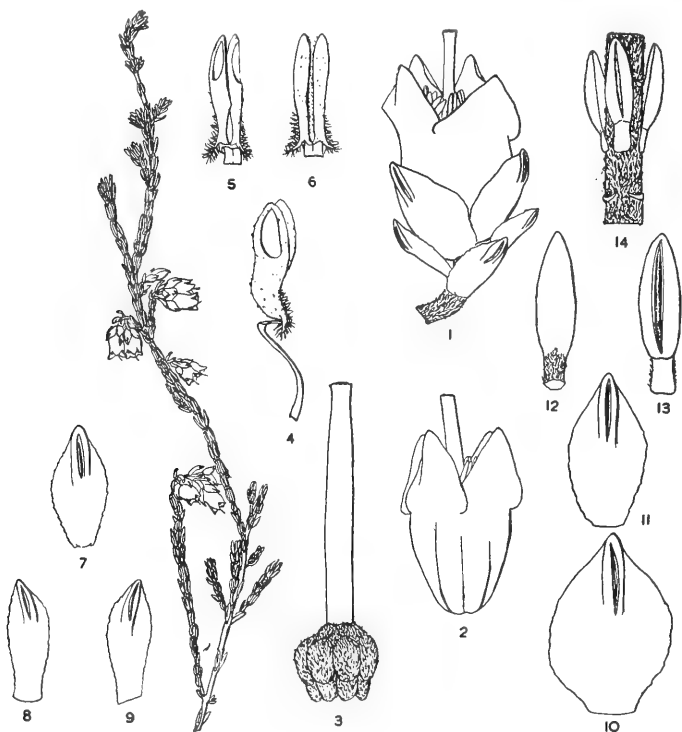


FIG. 11. *Erica pseudocalycina*. Portion of plant, nat. size. 1. Flower $\times 6$. 2. Corolla $\times 6$. 3. Gynaecium $\times 9$. 4. Stamen, side view $\times 9$. 5. Anther, front view $\times 9$. 6. Anther, back view $\times 9$. 7, 8, 9. Bracts $\times 9$. 10, 11. Sepals $\times 9$. 12. Leaf, front view $\times 6$. 13. Leaf, back view $\times 6$. 14. Whorl of leaves $\times 6$. (Compton 6282.) Del. L. R. van Niekerk.

lanceolata, coriacea, glabra, alba. *Corolla* alba, urceolata, segmentibus tubo subaequantibus, deltoideis, erectis. *Filamenta* flexuosa. *Antherae* fuscae, scabridulae, base appendicibusque fusco-ciliatis. *Ovarium* sessile, puberulum. *Stylus* robustus, exsertus, stigmatibus truncato.

A slender erect shrub. Stems puberulous with deflexed simple hairs.

Leaves 3-nate, erect, sub-imbricate, the petiole shortly ciliate and puberulous above, the lamina linear-lanceolate, subcarinate, sulcate, glossy, 4—5 mm. long \times 1 mm. wide. Flowers terminal, 3-nate, sub-cernuous. Pedicel 5 mm. long, puberulous. Bracts sub-approximate, glabrous, white, lanceolate, distally carinate-sulcate. Sepals glabrous,

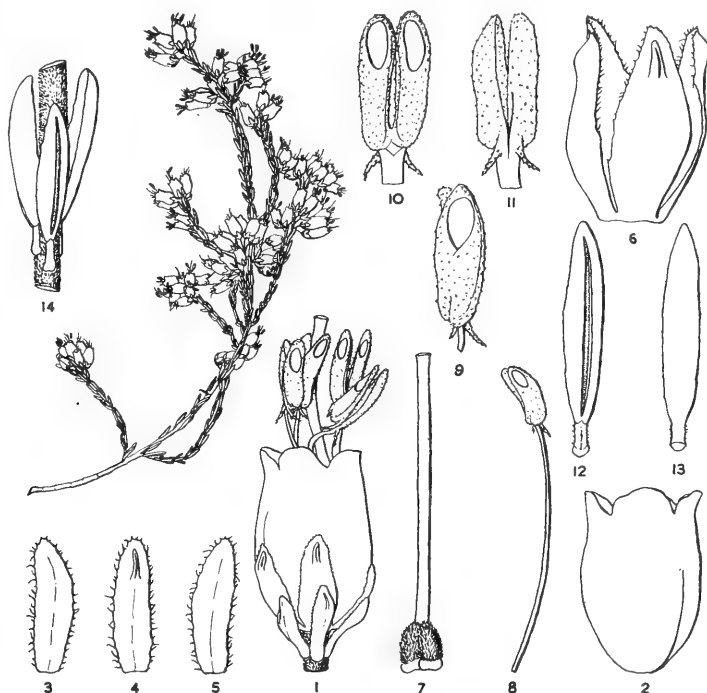


FIG. 12. *Thoracosperma Fourcadei*. 1. Flower \times 10. 2. Corolla \times 10. 3, 4, 5. Bracts \times 20. 6. Calyx \times 20. 7. Gynaecium \times 10. 8. Stamen \times 10. 9, 10, 11. Anther, side, front and back view \times 20. 12, 13. Leaf, back and front view \times 10. 14. Whorl of leaves \times 10. (*Fourcade* 5656.) Del. L. R. van Niekerk.

white, ovate-lanceolate, concave, distally carinate-sulcate, slightly overlapping at the base, coriaceous, 3 mm. long. Corolla white, urceolate, about 5 mm. long, the erect deltoid lobes nearly as long as the tube, overlapping at the base. Filaments sharply bent below the anthers. Anthers manifest, dark coloured, scabridulous, 2 mm. long, with short basal wings which taper to a subulate point and are fringed, as well as

the lower part of the anther, with dark cilia. Ovary sessile, puberulous. Style stout, 4 mm. long, shortly exserted, the stigma truncate.

Hab. Cape Province. Clanwilliam Division: Juriesberg (Cedarberg Range), 1,500 m. alt, 11 Feb., 1936, *Compton* 6282 (*Type*, in Herb. National Botanic Gardens); Middleberg Plateau, 1,500 m. alt., 14 Dec., 1941, *Compton* 12711; S.W. slopes of Grootberg, near summit, 4,000—4,800 ft., 21 Dec., 1940, *Esterhuysen* 4149; Cedarberg Mtns., Nov., 1939, *Stokoe* 7782.

Closely allied to *E. calycina* L., differing in the more slender growth, the more glossy surface of the leaves, the broader filaments, the sharp bend in the filament below the anther, the dark scabridulous bent anther with dark-ciliate base and appendages, the puberulous ovary and the more constantly erect corolla lobes. It flowers in the middle of the summer, whereas *E. calycina* is spring-flowering. Mr. N. S. Pillans concurs in recognising its specific distinctness.

Thoracosperma Fourcadei Compton. (Ericaceae—Ericoideae.)

Fruticulus gracilis ramosus. *Caules* minute puberuli. *Folia* 3-nata, erecta, linearia, sulcata, glabra. *Flores* numerosissimi, in fasciculis terminalibus. *Pedicelli* puberuli. *Bractae* 3, subapproximatae, scariosae, ciliolatae. *Sepala* breviter connata, ovata, convexa, scariosa, glabra, ciliolata, apice breviter sulcata, acuta. *Corolla* oblonga, quadrangula, glabra, segmentibus brevibus, obtusis. *Stamina* 4. *Antherae* exsertae, oblongae, scabridulae, fuscae, aristis brevibus, basalibus, divergentibus. *Ovarium* globosum, minute hispidulum, carpellis 4, uniovulatis, stigmate exserto, truncate.

A small much-branched shrub. Stems slender, minutely puberulous. Leaves 3-nate, erect, 3—4 mm. long, about as long as the internodes, linear, obtusely carinate, sulcate, glabrous. Flowers very numerous in small terminal clusters, spreading or deflexed. Pedicels puberulous, about 1·2 mm. long. Bracts 3, sub-approximate, linear-lanceolate, about 1 mm. long, scarious, minutely ciliate, the apex sulcate. Sepals shortly connate at the base, ovate, slightly convex, scarious, glabrous, coloured, about 1·5 mm. long × 0·6 mm. wide, the apex shortly sulcate, acute. Corolla oblong, 4-angled, not contracted inside the calyx, glabrous, rose-coloured, about 3 mm. long × 1·2 mm. diam., becoming slightly ovoid with age, the lobes 0·4 mm. long, erect, obtuse, minutely crenulate, sub-connivent with age. Stamens 4. Filaments 3 mm. long. Anthers exserted, oblong, scabridulous, dark-coloured, about 1 mm. long, with two short divergent awns, the pore about $\frac{1}{3}$ the length of the cell. Ovary on a short dark disc, globose, minutely hispidulous, 4-celled, each cell uni-ovulate, the style 4 mm. long, the stigma exserted, truncate.

Hab. Cape Province. Humansdorp Division : between the old Kouga road from Zuur Anys and the first ridge to the east, 400 m. alt. August, 1942. *Fourcade* 5656 (*Type*, in Herb., National Botanic Gardens), 5655.

Nearest to *T. Galpinii* N. E. Br., which comes from Garcia's Pass, Avontuur, Swartberg Pass, etc., localities sufficiently remote from that of the present species. It is best distinguished by its sepals, which are larger than in any other species. From *T. Galpinii* it also differs in the

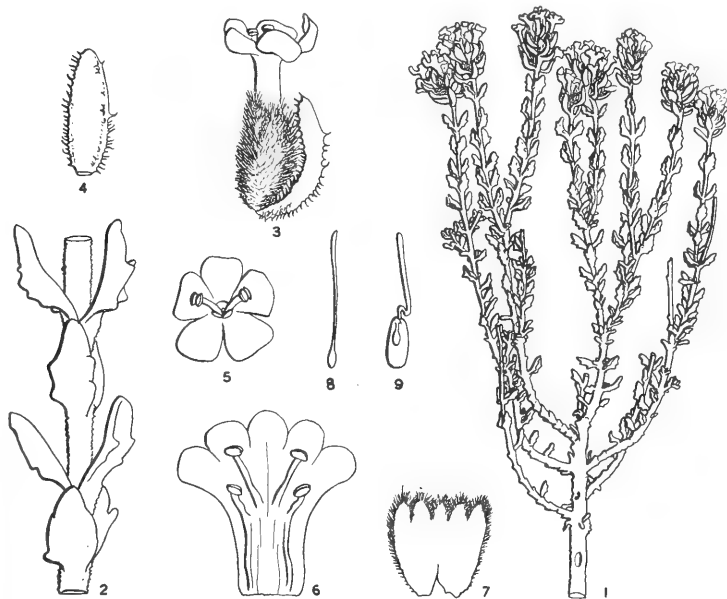


FIG. 13. *Globulariopsis wittebergensis*. 1. Portion of plant, nat. size. 2. Stem and leaves $\times 5$. 3. Flower $\times 5$. 4. Bract $\times 5$. 5. Corolla, from above $\times 5$. 6. Corolla, slit open $\times 5$. 7. Calyx, slit open, from inside $\times 5$. 8. Gynaecium from young flower $\times 5$. 9. Gynaecium from old flower $\times 5$. (*Compton* 9983.) *Del.* E. Wasserfall.

shape of the anther and its spurs. Dr. Fourcade separated his nos. 5656 and 5655 which, he said, grew together but could be distinguished in the field. I am inclined to regard them as younger and older stages of flowering respectively, but it is possible that subspecific genetic differences also exist.

Globulariopsis wittebergensis Compton in Trans. Roy. Soc. S. Africa, XIX, 309, 1931. (Selagineae.)

The genus *Globulariopsis* Compton, *loc. cit.*, p. 308, was founded to receive a single species from the summit of the Witteberg Range near Whitehill, collected in 1924. (*Compton* 2687, type, in Herb. Bolus.) Since then this plant has been collected on two occasions in the same range (*Compton* 12214, near Bantams, 1600 m., 27 October, 1941 ; *Compton* 13999, near Whitehill, 1500 m., 21 October, 1942) and also on the Bonteberg Range near the top of Eikenbosch Hoek Peak, 1500 m. (*Compton* 9983, 3 November 1940.) These three gatherings are in the Herbarium of the National Botanic Gardens. All four specimens must, I think, be regarded as conspecific, but they vary somewhat in length of calyx and corolla tube and in the hairiness of the bract and calyx. The original description was published without illustration, and this deficiency is now remedied by Miss E. Wasserfall's drawings, which are taken from the Bonteberg specimen.

Globulariopsis may be recognised readily by its persistently opposite leaves and by its uniovulate ovary.

SOME CHANGES IN NOMENCLATURE. IV.

By

PROFESSOR R. S. ADAMSON, MISS E. ESTERHUYSEN and DR. E. P. PHILLIPS.

1. BY R. S. ADAMSON.

In a recent number of this Journal (VII, 4, 189, 1941), a species was described under the name *Anthericum stenophyllum* Adamson. This name is, however, already occupied by another plant, *A. stenophyllum* Baker Bull. Herb. Boiss. XLII. 781, 1901, and is not valid. The species is now renamed ***Anthericum tenuifolium*** Adamson nom. nov.

2. BY E. ESTERHUYSEN.

Coleonema nubigena Esterhuysen nom. nov., vice *C. gracile* Schltr. in Engl. Bot. Jahrb. 27, 1899, a name invalidated by *C. gracile* E. and Z. Enum. I. 106, 1835.

Diosma oppositifolia L. should be adopted instead of *D. succulenta* Berg. Bergius' description, Pl. Cap., 63, 1767, agrees with the Linnean diagnosis, Sp. Pl., 198, 1753 and the cited figure, Comm. Rar. I., t. 1.

3. BY E. P. PHILLIPS.

Acmaenia matroosbergensis Phillips nom. nov. vice *Diosma Marlothii* Dümmer. Stamines are present and the ovary is immersed in the disc in the type, *Marloth* 7949! The figure in Ann. Bolus Herb. III, p. 1, 1920, shows stamines. The change of specific name is necessitated by the existence of *Acmaenia Marlothii* Dümmer, loc. cit. III, p. 86, 1921.

Acmaenia uniflora (Phillips) Phillips, comb. nov. vice *Euchaetis uniflora* Phillips.

Micrococca Benth, and ***Erythrococca*** Benth. In Hooker's Niger Flora (1849), Bentham described the above two genera with a single species in each, but both of which had previously been described under

other genera. (*Micrococca mercurialis* Benth = *Tragia mercurialis* Linn ; *Erythrococca aculeata* Benth. = *Adelia anomala* Poir). In reading through Benthams's descriptions I fail to find a character which will distinguish the two genera. The descriptions of the two genera in the "Flora Capensis", "Flora of Tropical Africa", and Benthams & Hooker's "Genera Plantarum" give no generic character whereby the genera may be separated. In the key, the difference is stated to be "perulate buds" in *Erythrococca* and "naked buds" in *Micrococca*. I have examined Wood's specimen No. 11810 quoted in the "Flora Capensis" as *Erythrococca berberidea* Prain and the buds are certainly not perulate. All the South African material in the National Herbarium has been dissected and I am of the opinion that the two genera as proposed by Benthams are not distinct.

MICROCOCCA Benth. emend. (*Erythrococca* Benth.) *Plants* dioecious or monoecious. *Petals* 0. *Male Flowers*: *Calyx* splitting into 3—4 valvate lobes. *Disc* 0. *Stamens* 2—60, usually intermixed with small glands and sometimes surrounded by a ring of similar free or connate glands; filaments free; anther-thecae free from the base or almost from the base. *Pistil* 0. *Female flowers*: *Calyx* 2—4-partite; lobes imbricate. *Disc* of linear or flattened scales, alternating with the carpels, rarely saucer-shaped. *Ovary* 2—3-chambered, rarely 4-chambered, with a solitary ovule in each chamber; styles 3, rarely 4, free or connate below, sometimes reflexed and lying on the ovary, plumose-laciniate. *Capsule* breaking up into 2-valved cocci or by abortion 1-coccous. *Seed* globose or sub-globose, with a thin aril; endosperm fleshy (or endosperm 0?).

Shrubs or herbs; leaves alternate, often large, often serrate, often acuminate; stipules small, sometimes modified into weak spines; inflorescence a raceme or spike; male flowers glomerulate and distant on the spike, occasionally with a central female flower, sometimes long pedicelled; female flowers usually solitary.

Micrococca natalensis (Prain) Phillips = *Erythrococca natalensis* Prain.

Micrococca berberidea (Prain) Phillips = *Erythrococca berberidea* Prain.

Buxus Linn. and **Notobuxus** Oliv. In South Africa two species belonging to the family *Buxaceae* have been described viz. *Buxus Macowanii* Oliv. which, so far as we know, only occurs in the Kingwilliamstown and East London districts, and *Notobuxus natalensis* Oliv., recorded from Zululand and Natal to Port St. Johns. *Notobuxus* Oliv. has been distinguished from *Buxus* Linn. on account of having six stamens as opposed to 4. An examination of the specimens of the two species in the National Herbarium, Pretoria leaves no doubt that both belong to the same genus. The number of stamens is not constant, as in a specimen of *Notobuxus*

natalensis Oliv. (Bayer 767 and Gerstner 4015) the number of stamens varies from four to eight ; the main character on which the two genera were separated thus breaks down.

J. Hutchinson (Kew Bulletin, 1912, p. 52), summarises the literature on the family *Buxaceae* and there is general agreement that the genus *Buxus* is characterised by having four stamens with the anthers supported by filaments and a rudimentary pistil in the male flower. In the "Flora of Tropical Africa" (1912) species with sessile anthers and without rudimentary pistils are placed in the genus *Buxus* solely on the number of stamens present. This in the writer's opinion is not justified, and it results in a discontinuous distribution of the genus *Notobuxus* in Africa leaving a gap between Angola and Nyasaland and Kingwilliamstown and East London, in which the genus is not supposed to occur. If it is accepted, as the writer maintains is the case, that the Zululand, Natal, and Pondoland plants belong to the same genus as the Kingwilliamstown and East London plants a link is provided with the Angola and Nyasaland plants which also have sessile anthers and no rudimentary pistil in the male flowers.

Two courses are open in dealing with the question, (1) either to enlarge the conception of the genus *Buxus* to include those plants with 4—8 stamens, sessile anthers, and without a rudimentary pistil or (2) to include all such plants in a separate genus *Notobuxus*. Earlier authors agree (see Hutchinson l.c.) that those species with sessile anthers and without a rudimentary ovary form a distinct section (*Buxella*) in the genus *Buxus* though they still retain the genus *Notobuxus* for those plants which have six stamens but which otherwise agree with species placed in the section *Buxella*. Linnaeus founded the genus *Buxus* on the species *B. sempervirens* which has anthers supported by filaments and a rudimentary ovary in the male plant ; Oliver (Hook. Ic. pl. 1518) when describing *Buxus Macowani* remarks "we have in the sessile anthers and suppression of the ovary-rudiment in the male flower a noteworthy departure from the normal generic character." The view is held here that the two characters viz. anthers supported by filaments and a rudimentary pistil in the male flowers as accepted by Baillon (1859) should characterise the genus *Buxus*, and that species with sessile anthers and without a rudimentary pistil, irrespective of the number of anthers, should be placed in a separate genus, the genus *Notobuxus* founded by Oliver (1880-1882). The generic description, however, requires slight emendation to meet the situation. The genera may be distinguished as follows :

BUXUS Linn. Stamens 4 ; anthers supported by filaments ; rudimentary pistil present in the male flower.

NOTOBUXUS Oliv. Stamens 4—8; anthers sessile; rudimentary pistil absent in the male flowers.

The separation of the two genera as indicated above necessitates some name changes as follows :—

1. **N. acuminata** (Gilg) Hutchinson.
2. **N. banguellensis** (Gilg) Phillips.
3. **N. Macowani** (Oliv.) Phillips.
4. **N. madagascarica** (Baill.) Phillips.
5. **N. natalensis** Oliv.
6. **N. nyasica** (Hutch.) Phillips.
7. **N. obtusifolius** Mildbr.

BOOK REVIEW.

THE CARNIVOROUS PLANTS. By Francis Ernest Lloyd, Emeritus Professor of Botany, McGill University. (Waltham, Mass., the Chronica Botanica Co., six dollars; Cape Town and Johannesburg, Juta & Co., Ltd.). 1942.

Of all the queer sides of plant life, Carnivorous Plants are surely the most incredible. They claim a place in every botanical course, and the need of a monograph more up to date than Darwin's classic (now nearly seventy years old) has long been felt. So Professor Lloyd's splendid volume is most welcome. It is the result of years of collecting data and carrying out innumerable experiments and observations on the living plants, involving much travel so as to study them in their native habitats. Two visits to this country are pleasant memories here. Of the fifteen genera of flowering carnivorous plants, he has studied all but *Genlisea* from living material. Had the trap of *Genlisea* been one of the "active" types, the writer is certain that nothing would have kept him from tracking it down in its unhealthy inaccessible tropical swamps. Fortunately, its lobster-pot trap can be adequately studied from preserved material, as is evident from his beautiful drawing of this remarkably intricate structure.

The chapters incorporating the author's own work on the trap-bladders of *Utricularia* and the closely-related *Pompholyx* and *Bio-vularia* are a specially valuable section of the book. It was through an observation on the entrance mechanism of one of these traps, fourteen years ago, that he was led to write it. On trying to compare this mechanism with that of other species, he found that precise accounts were lacking, and the exact mode of action of the trap was still a matter of puzzled dispute; not surprising in view of what he has now revealed of its extreme complexity and variety. So he began to investigate these traps for himself, and thus was gradually led up this fascinating botanical byway—a piece of real good luck for other botanists.

In general, these Bladderwort traps are hollow structures, mostly pear-shaped, with an opening closed by two valves. The larger valve (the "door") has several bristly hairs or other form of emergence acting as a tripping mechanism, contact with which knocks the base of the door off its threshold. In the "set" trap, the side walls are pulled inwards

owing to their withdrawing much of the water in the trap. Because of their structure and the turgidity of their cells these walls always strive to take an outwardly convex form ; and when the door is knocked open they suddenly expand outwards, with a resultant inrush of water that carries in the prey which has sprung the trap.

This very rough outline of their working does no justice to the complexity of the delicate interlocking structures which make these traps water-tight, or to their curious physiology and their variety. There are many different types—"as if to puzzle you to pick the best"—all so efficient that this is well-nigh impossible. A glance through the beautiful detailed drawings (over a hundred) and micrographs of these traps leaves one marvelling at the "infinite variety" of structure in these tiny objects, and the infinite patience and delicate skill involved in their dissection. It must be remembered that living turgid material is necessary for accurate description, and Professor Lloyd has used this as far as possible in studying the traps of seventy-five species. The writer vividly remembers his exquisite hand-sections and dissections of the microscopic living trap of *Utricularia capensis*—real miracles of manipulation when one compared the relative size of the two organisms!

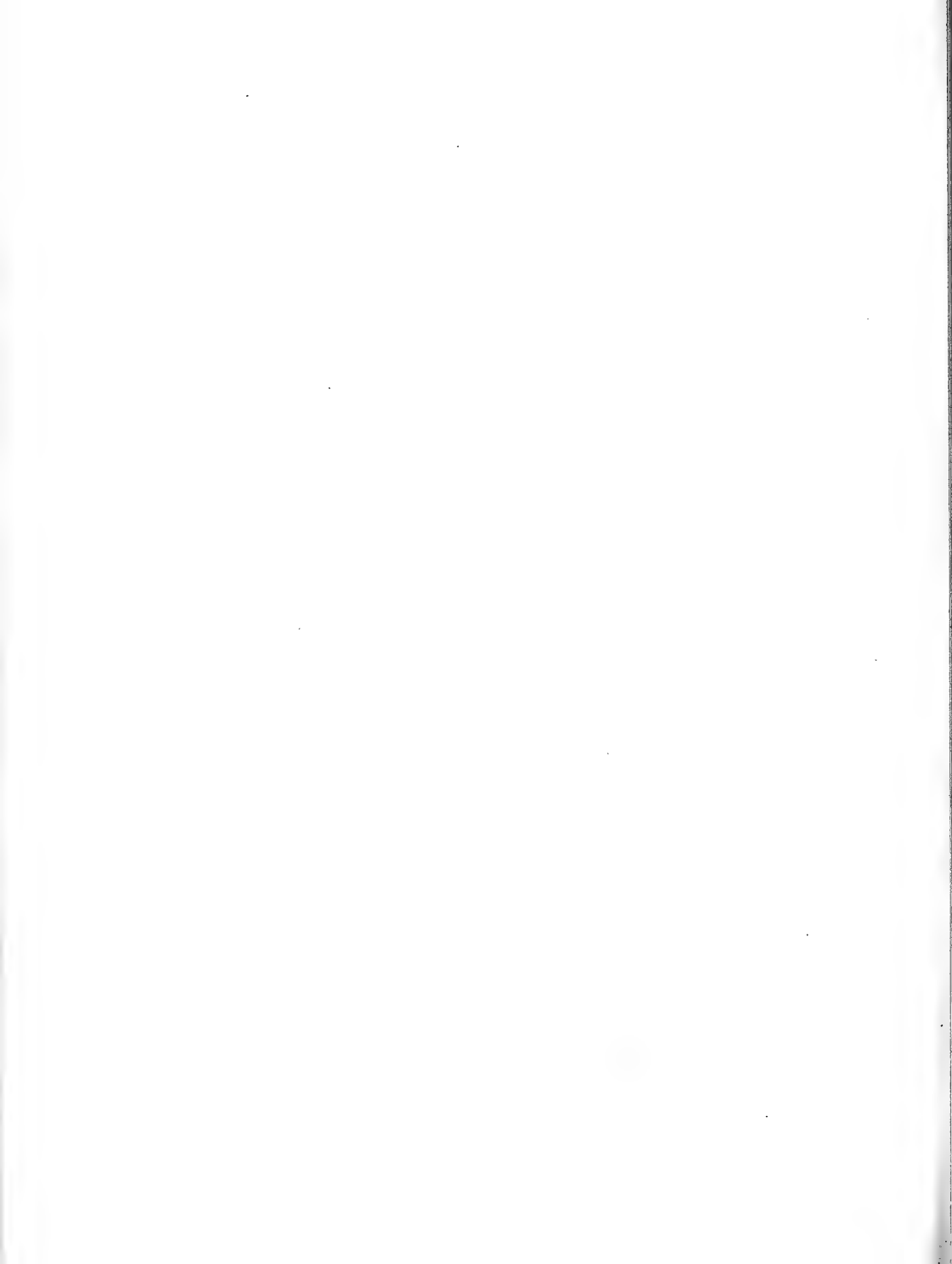
Though *Utricularia* has perhaps the most elaborate mechanism, the variety and fantastic ingenuity of the various traps and pitfalls described is amazing. Given the plant material to work with, a committee of engineering experts could hardly have bettered some of them. This applies also, on a microscopic scale, to the varied and ingenious trapping devices of the carnivorous fungi (a very useful chapter collects the scattered information about these oddities). Then too, their biological relations are full of surprises. Take for example the nineteen species of mosquito whose larvae live in the pitcher-water of *Nepenthes* and nowhere else. In *Sarracenia*, similar commensal larvae (of mosquito, gnat and fly) have been shown to secrete appropriate anti-enzymes to protect themselves against the pitcher's digestive fluids. *Utricularia* courts unpopularity with Queensland sugar planters by catching the tadpoles of *Bufo marinus*, which they imported to destroy insects in the cane. Space does not allow quotation of more of this entertaining biological information, but the book is well salted with it.

Carnivorous plants have attracted workers among amateur naturalists as well as professional botanists, and much good work by the former has been modestly hidden away in the journals of local Natural History societies and other publications not always read by botanists, with resultant duplication of effort. For example, the discovery that the bladder of *Utricularia* is no mere passive trap but an active piece of mechanism was made and published three times between 1911 and 1916, by an

entomologist in Switzerland, a botanist in India, and a student in England. Collection and correlation of the scattered data was obviously badly needed, and Professor Lloyd has done valuable service by his careful compilation and discussion of the work of others, to which he does full justice. All interested in these strange plants will be grateful to him for this invaluable guide to their morphology, ecology, physiology and general biological relations.

South Africa has many species of carnivorous plants, including the unique *Aldrovanda*, the smallest known *Utricularia*, the largest-leaved Sundew, and of course that classic guinea-pig, *Drosera capensis*. Much still remains to be found out about our species, and one hopes that this book will stimulate workers to fill the gaps in our knowledge. It is so clearly and entertainingly written that anyone with a modicum of botanical knowledge can enjoy it and use it as a guide. Professor Lloyd's drawings and photographs are very clear and helpful, and the 38 plates incorporate hundreds of them. Production is of the high standard we have learnt to expect from *Chronica Botanica*. Altogether, a distinguished performance for which thanks and congratulations are due to both author and publisher.

EDITH L. STEPHENS.



JOURNAL
OF
SOUTH AFRICAN BOTANY
VOL. IX.

PLANTAE NOVAE AFRICANAE.

"Ex Africa semper aliquid novi."—*Pliny*.

SERIES XX.

By

MISS W. F. BARKER, REV. FATHER F. J. GERSTNER, PROFESSOR R. S.
ADAMSON and PROFESSOR R. H. COMPTON.

Strumaria picta Barker. (Amaryllidaceae.)

Bulbus oblongo-globosus, in collo breve productus. *Folia* 2, hyste-rantha, erecta, oblongo-ob lanceolata, obtusa, supra pilis minutis sparse oblecta, marginibus minute ciliatis. *Umbella* c. 7 floribus, pedunculo pedicellisque minute pubescentibus. *Perianthii segmenta* ad basin libera, alba, infra linea media lata rubro-brunnea picta. *Filamenta* perianthio longa dimidia, apice angusta, infra ampliata, base stylo adnata. *Stylus* praeter apicem angustiore turgidus, stigmatibus 3-lobato. *Ovarium* globosum.

Hab. Cape Province. Calvinia Division: Lokenberg, *Compton* and Party, *Nat. Bot. Gdns.* 466/41 (*Type*, in Herb. National Botanic Gardens), flowered at Kirstenbosch 12 May 1943, leaves 21 June 1943.

Description.—*Bulb* oblong-globose, 3 cm. long, 2.5 cm. diam., covered with pale brown tunics produced into a short neck, about 1 cm. long. *Leaves* 2, just emerging at flowering time, erect, oblong-lanceolate, obtuse, shining, margin very minutely ciliate, recurved at the tip, blade green with dark purple patches on the back near the base, upper surface with scattered very minute hairs, lower surface glabrous, 10 cm. long, 2.2 cm. broad. *Umbel* up to 7-flowered. *Peduncle* slender, slightly pubescent with minute hairs, up to 13 cm. long. *Spathes* 2, papery, pale mauve

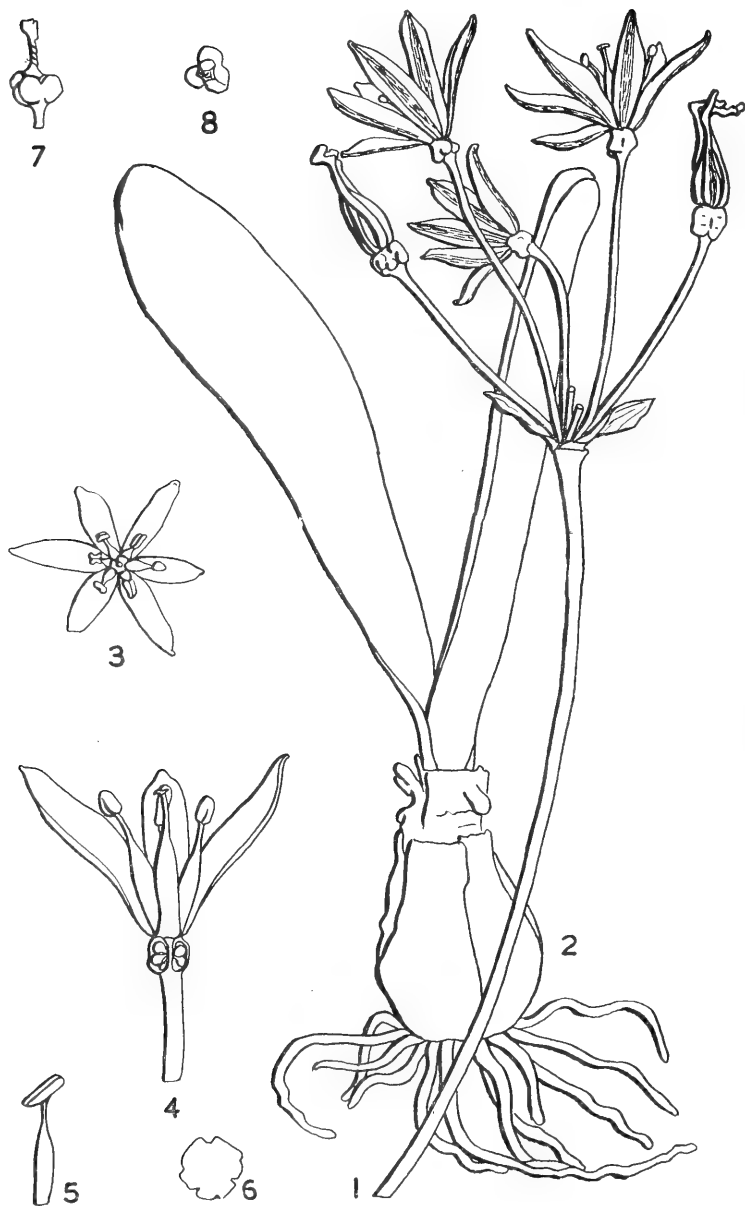


FIG. 1. *Strumaria picta* Barker. 1. Inflorescence, natural size. 2. Bulb with leaves produced a month later $\times 1$. 3. Flower, from above $\times 1$. 4. Longitudinal section of flower $\times 2$. 5. Young stamen $\times 2$. 6. Section across lower part of style $\times 5$. 7. Ripe fruit, side view $\times 1$. 8. Ripe fruit, from above $\times 1$. (Nat. Bot. Gdns. 466/41.) Del. E. Wasserrfall.

with darker stripes, up to 1.5 cm. long. *Pedicels* minutely and sparsely pubescent, up to 5 cm. long. *Perianth-segments* free to the base, white with a broad reddish-brown stripe down the centre of the back, the three outer 1.8 cm. long and 4 mm. broad, the inner 1.7 cm. long and 4.5 mm. broad. *Stamens* about half as long as the perianth; anthers dorsifixed, dark purple brown when young, 3 mm. long; filaments slender in the upper half, widening to 1.5 mm. at base, free from one another but joined to the base of the style. *Style* 1.2 mm. long, triquetrous and thickened in the lower two thirds, slender above; stigma minutely three lobed. *Ovary* globose, 3 mm. diam. with several ovules in each cell, only one of which usually matures.

This plant has the largest flowers yet found in the genus *Strumaria*, and the broad stripe down the centre of the back of the segments makes them very striking. It is this character which has suggested the name.

***Strumaria pubescens* Barker. (Amaryllidaceae.)**

Bulbus globosus, in collo longo productus. *Folia* 2, hysterantha, oblongo-lanceolata, expansa, superficie superiora et marginibus pilis albis mollis obtectis. *Umbella* 5—7 floribus, pedunculo pedicellisque glabris. *Perianthium* pallide roseum, fere ad basin partitum, segmentis erectis, apicibus recurvatis. *Stamina* perianthio clare breviora, biseriata, styli base adnata. *Stylus* ad apicem sensim angustatus, stigmate 3-lobato. *Ovarium* globosum.

Hab. Cape Province. Laingsburg Division: Ngaap Kop, *Compton* 14417 and *Nat. Bot. Gdns.* 151/43 (*Type*, in Herb. National Botanic Gardens), flowers 25 Feb. 1943, leaves 7 June 1943.

Description.—*Bulb* globose, 2 cm. long, 1.5 cm. diam., covered with brown tunics which continue upwards to form a neck, up to 5 cm. long, round the base of the peduncle. *Leaves* 2, hysteranthous, spreading, oblong-lanceolate, about 4.5 cm. long and 1 cm. broad, upper surface and margin covered with soft white hairs up to 2 mm. long, the base of the inner leaf enclosed in a sheath formed by the base of the outer. *Umbel* 5—7-flowered. *Spathes* 2, papery, mauve, up to 1.5 cm. long. *Peduncle* glabrous, shining, reddish-brown, slightly thickened at the base, 6—8.5 cm. long. *Pedicels* glabrous, shining, reddish brown, shading to green at the top, 2—3 cm. long. *Perianth* segments free almost to the base, erect with the tips recurved, pale pink with darker pink down the centre, 2.5 mm. broad, 1—1.5 cm. long. *Stamens* distinctly shorter than the perianth, in two rows, three maturing before the rest; filaments pale pink, joined to the base of the style, longest up to 7.5 mm. long; anthers dark purple. *Style* narrowing gradually towards the top; stigma minutely three lobed. *Ovary* globose, 1 mm. diam.

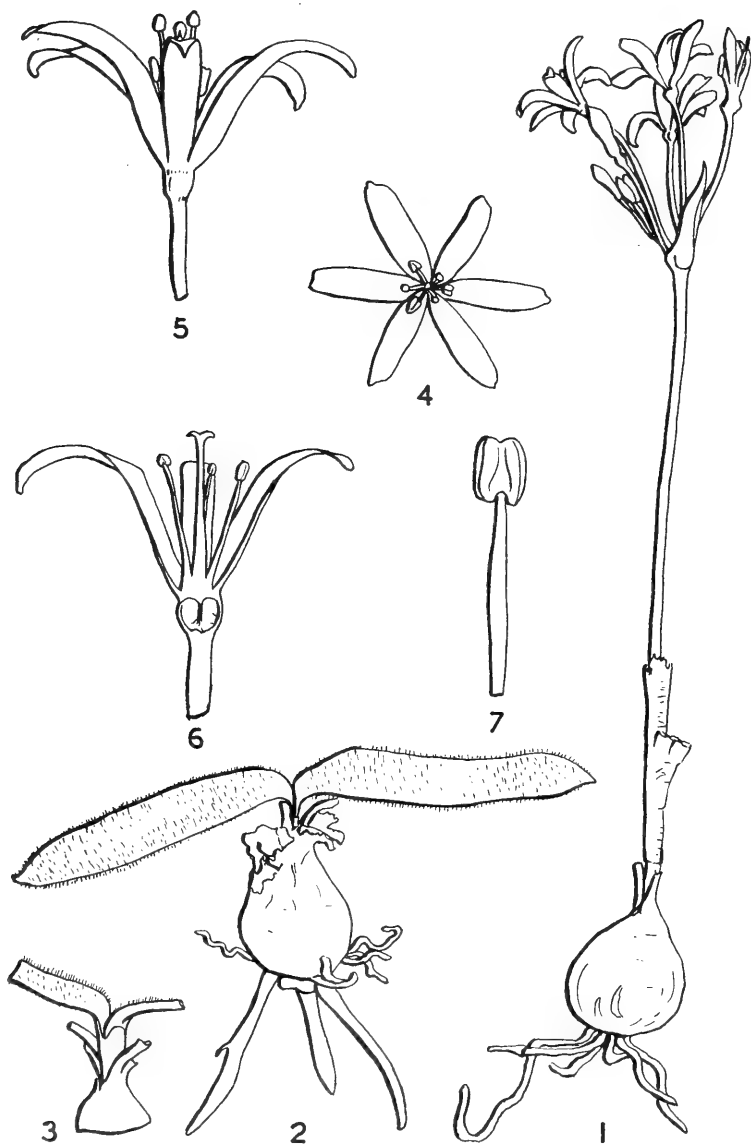


FIG. 2. *Strumaria pubescens* Barker. 1. Bulb with inflorescence, natural size. 2. Bulb with leaves produced three and a half months later $\times 1$. 3. Portion of bulb and leaves, side view $\times 1$. 4. Flower from above $\times 2$. 5. Flower, side view $\times 3$. 6. Longitudinal section of flower $\times 3$. 7. Young stamen $\times 10$. (Compton 14417. *Nat. Bot. Gdns.* 151/43.) Del. E. Wasserfall.

The characters distinguishing *Hessea* and *Strumaria* are very slender, as a detailed study of the genera will show. The shape of the anther varies according to the stage of development of the flower; the young anther may appear to be basifixed, but when it has shed its pollen and shrunk it has the appearance of being dorsifixed. This is the case in *Strumaria pubescens*. It may be found necessary to merge the two genera, but in the meantime as a general rule, plants with star-shaped flowers with segments spreading from the base are put into *Hessea*, while those with more funnel-shaped flowers are included in the genus *Strumaria*.

***Dietes Butcheriana* Gerstner. (Iridaceae-Moreae.)**

Dietes iridioides Sweet affinis, majoribus foliis, petalo interiore basi striata colore luteo, stylo immaculato albo differt. Herba cormibus 15—30 cm. longis, foliis linearibus lanceolatis circiter 120 cm. longis et 4—5 cm. latis. *Folia* decrescentes ad basin sinu sicut culter. *Folia et caules* inflorescentium coriaceae nervis multis parallelis prominentibus. *Inflorescentia* multibrachiata circiter 50 cm. alta, rudimentis foliorum praedita. *Spathes* similiter formatae sicut rudimenta foliorum, cylindrica. *Ovarium* pallens viride, 1.5 cm. longum, 0.3 cm. latum. *Flores* albae. *Petala exteriora* obovata, 3 cm. longa, 1.5 cm. lata alba, basi luteis striata stigmatibus. *Petala interiora* obovata, 3 cm. longa, 1.2 cm. lata, margine ad basin nonnullis luteis striata stigmatibus. *Stylus* tripartitus albus immaculatus, segmentis lanceolatis 2 cm. longis, 0.8 cm. latis. *Tria stamina* 1 cm. longa, filamenta 0.5 cm. longa, 0.05 cm. lata alba-lutea; pollinia lanceolata, 0.5 cm. longa, 0.15 cm. lata, lutea. *Pollen* globosus. *Stylus* unitus basi filamentis in formam tubi. *Semina* atra triangularia, 0.5 cm. diam. *Capsula* ovoidea, 5 cm. longa, 2 cm. lata.

Habitat in deep shade of the mistbelt-forests of Entumeni-Eshowe-Ongoye range of Nkandla Forest (cf. University of Cape Town, Bolus Herbarium. Gerstner 601 & 4159 (type) and Natal Herbarium 11923). *Dietes iridioides* Sweet (cf. Bolus Herbarium, Gerstner 4160 & Natal Herbarium, Maurice & Evans 309) is more frequent and grows even along streams in the bushveld and open places. The Zulus call *Dietes Butcheriana* "Indawo enkulu" or "Indawo yehlathi" and use the root for curing dysentery. *Dietes iridioides* is called "Indawo" only or "Indawo encane" and is used at the first menstruation custom of the Zulus (NMA), who mix 3 pieces of Indawo encane-roots with kafir-corn to make a special bread or porridge for the girl, who, with her girl-friends, paint their faces with ochre and hide themselves for several days.

Dietes Butcheriana is a herb with a corm 15—30 cm. long and somewhat thicker than a finger. The sword-like leaves are about 120 cm.

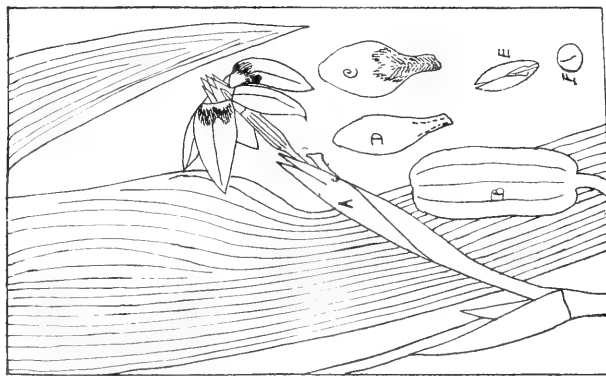


FIG. 3. *Dietes Butcheriana*. A, flowering branch; B, fruit; C, outer petal; D, inner petal; E, style-crest: all half natural size; F, pollen-grain, much enlarged. Del. F. J. Gerstner.

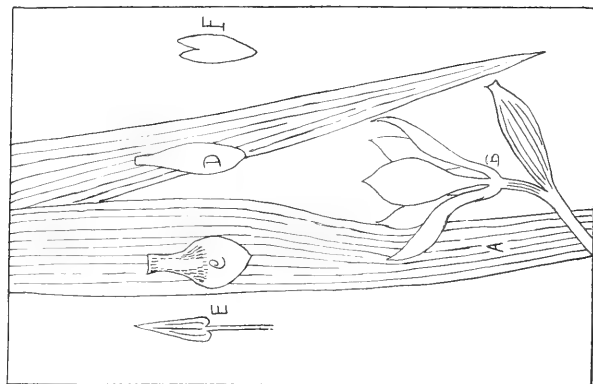


FIG. 4. *Dietes iridioides*. A, leaf; B, branch with flower and ripening fruit, the spathe removed; C, outer petal; D, inner petal; E, stamen; F, style-crest. E $\times 4$, others half natural size. Del. F. J. Gerstner.

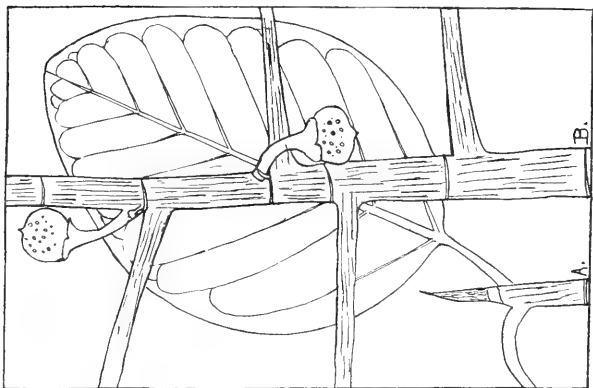


FIG. 5. *Ficus hippopotami*. A, branch with leaf; B, branch with fruits, half natural size. Del. F. J. Gerstner.

long and 4—5 cm. wide and suddenly smaller towards the base, forming a slight sinus. The leaves and peduncles are coriaceous and the many parallel veins prominent. The inflorescence is multibranched, about 50 cm. high and bears many rudimentary leaves. The cylindrical spathes enclosing the flowers are sheathes similar to the rudimentary leaves. The ovary is pale green. The flowers are white and the corolla very deciduous. The outer petals are obovate, 3 cm. long and 1.5 cm. wide and have a yellow keel at the base of the blade. The inner petals are likewise obovate, about 3 cm. long, 1.2 cm. wide and have a few orange striations along the margin towards the base, whereas the inner petals of *Diets iridioides* are pure white in colour. The tripartite style is pure white and has not the bloom of purplish-blue like the style of *Diets iridioides*. The segments of the style are 2 cm. long and 0.8 cm. wide. The 3 stamens are 1 cm. long. The lanceolate filaments and anthers are both 0.5 cm. long. The filaments are yellowish white, the anthers yellow. The pollen-grains are globose. The style is united with the stamens towards the base to form a short tube. The fruit is an ovoid capsule, 3-celled, containing in each cell about 18 black, rugose seeds in form like segments, 6 of which would form a cylinder of 1 cm. diameter and only 0.2 cm. long. The *Diets*, which Wood figured as *Diets iridioides* in his "Natal Plants," is probably *Diets Butcheriana* (cf. inner petals and size of leaf).

Named after Mr. Harry J. Butcher, who has for many years grown both species in his garden of indigenous plants at Durban.

***Ficus hippopotami* Gerstner. (Moraceae.)**

Fico congensi Engl. et *Fico Nekkuda* Warb. similis sed fructibus pilosis et forma fruticis a *Fico congensi* (fructibus glabris et arbor alta) et fructibus pedicellatis et forma fruticis a *Fico Nekkuda* (receptaculis sessilibus et arbor alta) differt.

Frutex multibrachiata amans loca paludosa costalia (Hinc nomen). *Cortex* basis verrucosa, longitudinaliter et tenuiter fissa, canaque. *Basis* 30—60 cm. diam. *Folia* late ovata-cordata, breviter acuminata apice subacuta, plerumque 12 cm. \times 16 cm. sed 21 \times 28 cm. non rara. Costa media nervique laterales supra paululum prominentes infraque multum prominentes. *Foliorum lamina* supra reticulata, glabra, infra reticulata pubescentia. *Petioles* 4—10 cm. longi et pubescentes. *Stipulae* pallide brunneae, caducae oblongae ovatae, circiter 3 cm. longae, 1 cm. latae plus minusque pilosae. *Fici* axillares solitarii, nati in paribus uno abortivo. *Pedunculus* 2—2.5 cm. longus. *Receptacula* pedicellata, rufa pubescentia maculis luteis, 2 cm. \times 3 cm. piriforma. *Bractae* basales 2, rufae pubescentes. *Ostiolum* poriforme.

Habitat : In swamps of the Zululand coast. *Gerstner* 2940 in Natal and Kew Herbarium (*type*) with receptacles, found 3/3/39 at Mtunzini on the way to the Siyayi Lagoon, left-hand side in very deep swamps, about 100 yards before the cars going to the Siyayi Lagoon have to stop on the sands. Cf. also *Gerstner* 4162 in the University of Cape Town, Bolus Herbarium.

Ficus hippopotami is named in accordance with its Zulu name "umVubu," and the geographical distribution of the hippopotami (in Zulu "imVubu") and of this *Ficus* is very much the same in Zululand. In shape it is a very much branched shrub and seldom reaches the form of a tree. According to a report from Kew-Herbarium *re* my specimen 2940 "it is nearest *Ficus congensis* Engl., but it differs in having pubescent receptacles." As *Ficus congensis* is a big tree and our species a typical shrub I dare to assume that both differ quite well. If no fruits are present it will be very difficult to distinguish this species looking on the leaf-characters only from *Ficus Nekbuda*; but the sessile fruits of the latter are a very good distinctive characteristic, but they differ in form and in habitat as well, for *Ficus Nekbuda* prefers the hills near the sea and grows to a huge tree. *Ficus hippopotami*, on the other hand, is a much-branched shrub, branching always near the base and prefers the swamps. The bark of the bigger stems (30—60 cm.) is verrucose, slightly longitudinally fissured and grey. The leaves are large ovate-cordate with short subacute apex. They are usually of a size of about 12×16 cm., but leaves of 21×28 cm. also occur. The strong midrib is elevated slightly on the upper surface but very much so on the lower one. The blades are reticulate, coriaceous above and pubescent and reticulate below. The petioles are about 4—10 cm. long and pubescent. The stipules are pale brownish-red, deciduous, oblong-ovate, about 3 cm. long and 1 cm. wide and more or less hairy. The figs are single in the axils of the leaves, although they are borne in pairs, but one is usually abortive. The peduncles are 2—2.5 cm. long, the receptacles hairy, reddish with yellow spots, 2×3 cm., in form like a little pear. The two bracts are reddish hairy and the ostiole small and round.

***Trigloch in compactum* Adamson. (Juncaginaceae.)**

Herba tuberosa. *Tuberi* parvi, fusiformes, numerosi, in aggregato bulbiforme congesti, fibris teneris intertextis circumdati. *Folia* pauca, 1—4, erecta, linearia, subrigida, saepissime hysternantha, vaginis pallidis, elongatis. *Scapus* erectus, rigidus, 12—15 cm. altus, foliis multo longior, racemo subsecundo. *Pedicelli* florum subnulli, fructum elongati, circa 3 mm., erecti vel ascendentes. *Fructus* 4—5 mm. longus, 1 mm. latus, angustissime ovoideus, stigmatis divaricatis.

Hab. Cape Province. Cape Peninsula: Slopes of Karbonkelberg above Hout Bay, *Compton* 14436 (*type* in Herb. Nat. Bot. Gdns.); *Isaac* 10. Griqualand East: Zuurborg, *Tyson* 1866.

A distinctive species flowering in late summer, distinguished by the bulb-like underground part, 2—3 cm. diam., the numerous pointed tubers, the few erect usually hysteranthous leaves, and the slender rigid scapes.

Crassula Levynsiae Adamson. (Crassulaceae.)

§ *Tillaeoideae*.

Caules perennes, decumbentes, radicales, apice ascendentes, 4—6 cm. longi, pauciramosi. *Folia* patentia, glabra, carnosa, subclavata, 4—5 mm. longa, 1—2 mm. diam. *Flores* 2—3 axillares, pedicellis 3—4 mm. longis, tandem decurvatis. *Lobi calycini* acuti, tubo conico breviores. *Petala* alba, obovata, obtusa vel cucullata, 3—4 mm. longa, staminibus duplo longiora. *Squamae* truncatae, apice rubrae, anthesin carpidia aequilongae. *Carpidia* subsphaerica, uniovulata, stylo duplo longiora.

Hab. Cape Province. Cape Division: damp heathy hollows on the Cape Flats. Fl. June-July. Klipfontein Road, 11 m. from Cape Town, *Levyns* (*Adamson* 3497, *type* in Herb. Bolus); Fish Hoek, *Levyns*.

Flowers much like those of *C. natans* Thunb., but the leaf and habit quite different. Named in honour of Mrs. M. R. Levyns, the discoverer of the species.

Erica Bondiae Compton. (Ericaceae—Ericoideae.)

§ *Evanthe*.

Fruticulus erectus, ubique, praeter in corolla, glandulis stipitatis indutus. *Folia* 3—4-nata, erecto-patentia, obtusa, oblonga, sulcata. *Flores* 1-, 3- vel 4-nata, terminales. *Bractae* 1 media, alterae subapproximatae. *Sepala* lineari-lanceolata, infra scariosa, supra viridia, sulcata. *Corolla* glabra, anguste obconico-campanulata, lobis parum expansis. *Antherae* dorsifixae, triangulares, laeves, muticae. *Ovarium* oblato-globosum. 8-lobatum, glabrum. *Stigma* haud exsertum, parum obliquum, capitellatum.

A small slender erect shrub, all vegetative parts (stems, leaves, pedicels, bracts and sepals), bearing spreading stalked glands. Leaves 3-nate or 4-nate, erecto-patent, longer than the internodes, 3—5 mm. long, oblong, obtuse, sulcate or slightly open-backed, the margins rounded. Flowers terminal, 1-, 3- or 4-nate. Pedicels straight or decurved, 3—4 mm. long. Bracts 3, one median, the other two subapproximate, linear, green. Sepals linear-lanceolate, sub-scarious at base, green and sulcate at tip, 3—4 mm. long. Corolla narrow obconical-campanulate, pale pink, of delicate texture, glabrous, the tube c. 9 mm.

long, the lobes slightly spreading, c. 2 mm. long. Filaments c. 8 mm. long, curved below the anthers. Anther dorsifixed, broad-based, acute, dark brown, smooth, muticous, c. 1.3 mm. long, the pore about $\frac{1}{2}$ as long as the cell. Ovary on a lobed disc, oblate-globose, 8-lobed, glabrous. Style c. 8 mm. long, the stigma capitellate, slightly oblique.

Hab. Cape Province. Uniondale Division: Mannetjeberg (Kamanassie Mts.), 1000 m. alt., 1 Feb. 1941, *Bond* 925. (*Type*, in Herb. Nat. Bot. Gardens).

This new *Erica* is perhaps most nearly related to *E. glandulosa* Thbg., and bears some resemblance to the var. *breviflora* Bolus. The latter variety is based on *Burchell* 4803 "On the road between Gamtoos River and Inhospitable Station" in the Humansdorp Division, i.e. in the middle of the *E. glandulosa* area, and about 130 miles from the Mannetjeberg. From this plant *E. Bondiae* differs, moreover, in its shorter sepals and anthers, smaller and glabrous corollas, and the shorter but more numerous glandular hairs on leaves and calyx. From typical

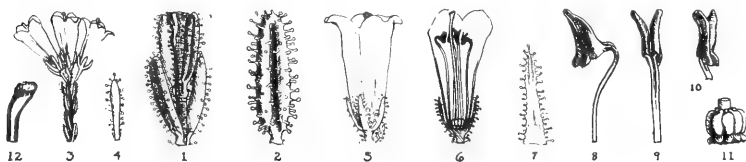


FIG. 6. *Erica Bondiae*. 1. Portion of shoot $\times 6$. 2. Leaf $\times 10$. 3. Inflorescence $\times 1$. 4. Bract $\times 5$. 5. Flower $\times 2$. 6. L.s. Flower $\times 2$. 7. Sepal $\times 5$. 8, 9, 10. Stamens $\times 10$. 11. Ovary $\times 5$. 12. Stigma $\times 5$. (*Bond* 925.) *Del.* M. Walgate.

E. glandulosa it is of course widely distinct, though I think it should be associated therewith, and accordingly placed in the § *Evanthe*, in spite of the small corolla, which only just attains the length of $4\frac{1}{2}$ lines, which is regarded as the minimum for this section in the *Flora Capensis*.

Erica ostiaria Compton.

§ *Pyronium*.

Frutex erectus, ramcosus, subfastigiatus. *Caules* dense plumoso-pubescentes. *Folia* 3-nata, glabrescentia, linearia, sulcata, imbricata, erecto-patentia. *Flores* in fasciculis parvis, terminalibus axillaribusque. *Pedicelli* plumoso-pubescentes. *Bractee* approximatae, obtusae, sulcatae, puberulae. *Sepala* ovato-lanceolata, obtusa, puberula, apice sulcata. *Corolla* urceolata, faucibus parum constrictis, minute puberula, lobis brevibus, obtusis, erectis. *Antherae* exsertae, muticae, scabridulae.

Ovarium globosum, pubescente. *Stigma* longe exserta, capitellata, 4-umbonata.

An erect, much-branched, somewhat fastigiate shrub. Stems densely grey-plumose-pubescent. Leaves 3-nate, very minutely puberulous when young, quickly glabrescent, linear, obtuse, sulcate, 2—3 mm. long, erecto-patent, imbricate. Flowers in small terminal and axillary clusters of 4—7. Pedicels plumose-pubescent, c. 3—4 mm. long. Bracts approximate, narrow-elliptical, obtuse, sulcate, puberulous, the longest

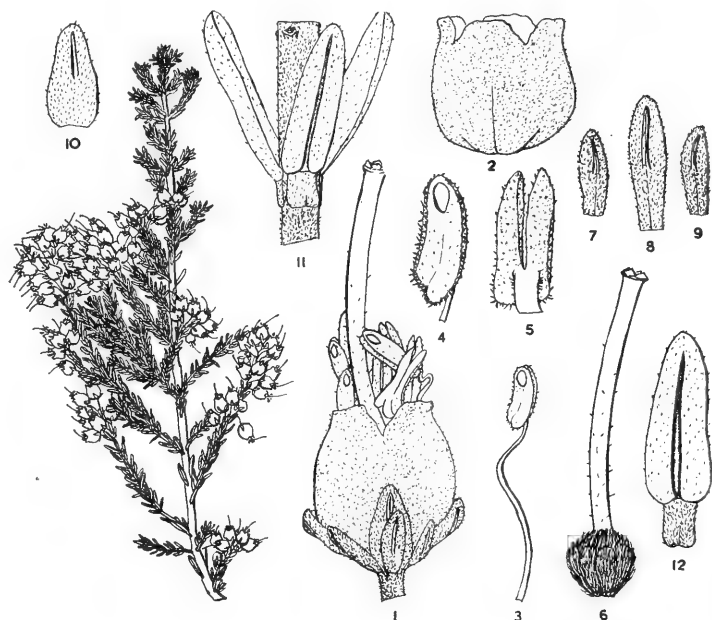


FIG. 7. *Erica ostiaria*. Branch, nat. size. 1. Flower $\times 10$. 2. Corolla $\times 10$. 3. Stamen $\times 10$. 4, 5. Anther, side and back view $\times 20$. 6. Gynaeceum $\times 10$. 7, 8, 9. Bracts $\times 20$. 10. Sepal $\times 10$. 11. Whorl of leaves $\times 10$. 12. Leaf $\times 10$. (Compton 8660.) Del. L. R. van Niekerk.

c. 1 mm. long. Sepals ovate-lanceolate, obtuse, puberulous, sulcate at the tips, c. 1.5 mm. long. Corolla urceolate, slightly narrowed at the throat, minutely puberulous, pinkish white, c. 2 mm. long \times 2 mm. wide, the lobes short, very obtuse, erect. Filaments slender, somewhat flexuous. Anthers exserted, dorsifixed, muticous, scabridulous, obtuse, c. 1 mm. long, the pore small. Ovary globose-pubescent. Style slender with a few short hairs, slightly curved, 5 mm. long. Stigma capitellate with four terminal protuberances, far-exserted.

Hab. Cape Province. Prince Albert Division: Seven Weeks Poort, Klein Swartberg, 1000 m. alt., 23 March 1940, *Compton* 8660 (*Type*, in Herb. National Botanic Gardens); *Primos* 24.

Erica ostiaria is most nearly related to *E. demissa* Klotzsch and *E. bicolor* Thbg., the former having a more easterly and the latter a more westerly distribution. From *E. demissa* it is distinguished by its wider corolla, its approximate bracts, and its further-exserted hispidulous anthers. From *E. bicolor* it differs in its puberulous dull-coloured corolla, exserted muticous anthers and approximate bracts.

***Erica philippioides* Compton.**

§ *Arsace*.

Fruticulus mollis, ramosissimus, diffusus, ubique breviter pubescens. *Folia* 3-nata, erecto-patentia, linearia, sulcata, obtusa. *Flores* minuti, terminales, plerumque 3-nati, aggregati. *Bractee* 2, remotae. *Sepala*

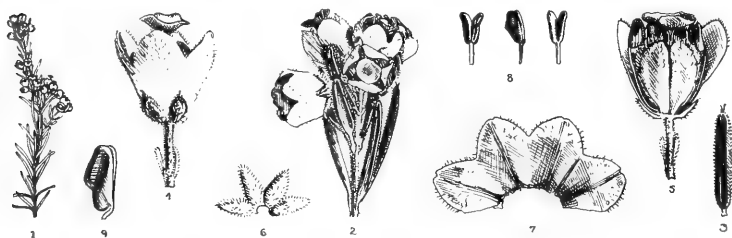


FIG. 8. *Erica philippioides*. 1. Portion of plant $\times 1$. 2. Inflorescence $\times 5$. 3. Floral leaf $\times 5$. 4. Flower $\times 10$. 5. L.S. Flower $\times 10$. 6. Calyx $\times 10$. 7. Corolla $\times 10$. 8. Stamens $\times 10$. 9. Anther $\times 20$. (*Compton* 7037.) *Del.* M. Walgate.

base connata, ovata. *Corolla* campanulata, alba, puberula, lobis tubo subaequantibus. *Antherae* inclusae, subcohaerentes, laeves, bilobatae, obtusae, muticae. *Ovarium* globosum, minute hispidulum. *Stylus* perbrevis, stigmate peltato, manifesto.

A small much-branched soft diffuse or spreading shrub. Stems slender, straight or flexuous, shortly pubescent. Leaves 3-nate, erecto-patent, linear, sulcate, obtuse, shortly pubescent, 4–5 mm. long, 0.5 mm. wide. Flowers minute, terminal, mostly 3-nate, clustered towards the ends of the branches. Pedicel, bracts, calyx and corolla puberulous. Pedicel 0.5 mm. long. Bracts 2, remote, 0.2 mm. long. Sepals connate at base, ovate, 0.5 mm. long. Corolla campanulate, open-mouthed, white, 1.0 mm. long, the lobes broadly ovate, obtuse, nearly as long as the tube. Filaments very short and slender. Anthers subcoherent

round the style, smooth, bilobed, obtuse, mucous, 0.4 mm. long. Ovary globose, minutely hispidulous. Style very short. Stigma peltate, manifest.

Hab. Cape Province. Clanwilliam Division: Middleberg (Cederberg Mts.), waterfall 1300 m., 25 Sept. 1937, *P. de Kock* and *Compton* 7057. (*Type*, in Herb. Nat. Bot. Gardens); Tafelberg, 2000 m., south side, among rocks, 25 Sept. 1942, *Esterhuysen* 8101; Waterkloof, 1000 m., 26 Sept. 1942, *Esterhuysen* 8108.

An inconspicuous plant with very numerous minute flowers, having the appearance in growth and many of the floral characters of a *Philippia* or other minor Ericoidean genus. Bracts are present, however, as well as the eight stamens and the 4-locular multi-ovulate ovary of a typical *Erica*. The bracts on the pedicel are two, the other being basal and not coming away with the pedicel. (Other species of the § *Arsace* also show a reduction in the number of bracts.) So far only known from moist shady situations high in the Cederberg Range.

***Erica sonora* Compton.**

§ *Ceramus*.

Frutex erectus. *Caules* virgati, glabri. *Folia* 3-nata, suberecta, linearia, sulcata, glabra, mucrone subpungente. *Flores* laxae aggregati in pedunculis terminalibus. *Pedicellus* elongatus, minute puberulus. *Bractae* submedianae, angustae, puberulae, acuminatae. *Sepala* parva, deltoidea, puberula, apiculata. *Corolla* globoso-inflata, supra medio latiora, glabra, rosea, segmentis parvis, erectis vel subexpansis, saturate roseis. *Antherae* triangulares, in filamentis curvatis dorsifixae: cristae latae, dentatae, adnatae, apicibus subulatis, deflexis: foramina magna. *Ovarium* stipitatum, obovoideum, glabrum, stylo recto, stigmatibus manifestis, capitellato.

An erect shrub up to 1 m. high, with virgate branches. Stems glabrous. Leaves 3-nate, sub-erect or slightly curved, linear, sulcate, acute, ending in a sub-pungent mucro, glabrous, 10—15 mm. long, 1 mm. wide. Flowers numerous in a loose cluster on a terminal bracteate peduncle. Pedicel slender, 6—8 mm. long, minutely puberulous. Bracts scattered, sub-median, variable in position, slender, apiculate, puberulous, c. 1 mm. long. Sepals deltoid, puberulous, c. 1.5 mm. long, apiculate. Corolla globose-inflated, widest slightly above the middle, c. 5 mm. long and diam., pink, glabrous, the segments small, erect or sub-spreading, deeper coloured, 1 mm. long. Anthers triangular, c. 0.8 mm. long., dorsifixed on slender bent filaments, with broad adnate toothed crests with deflexed subulate points, the pores almost as long as the cells. Ovary stipitate,

obovoid, glabrous, the style straight, 2 mm. long, the stigma manifest, capitellate.

Hab. Cape Province. Van Rhynsdorp Division: Snorkfontein (Giftberg), 600 m. alt., 30 May 1938, *Compton* 7214 (*Type*, in Herb. Nat. Bot. Gardens); same locality and date, *Salter* 7269.

Erica sonora is allied to *E. inflata* Thbg., which it much resembles in habit of growth, leaves and inflorescence. It differs, however, in the shorter pedicels, the smaller flowers with a relatively broader globose corolla, the correspondingly shorter filaments and style, and especially in the stamen crests which are very distinct from the long-curved, thread-like awns on the anther-cell possessed by *E. inflata*. Thunberg's type of *E. inflata* (in Herb. Kew.) has an ovoid corolla: and although the figures of *E. ollula* Andr. (which Fl. Cap. regards as synonymous with *E. inflata*) in *Heathery* 275 and *Lodd. Bot. Cab.* 1646 show a globose corolla they

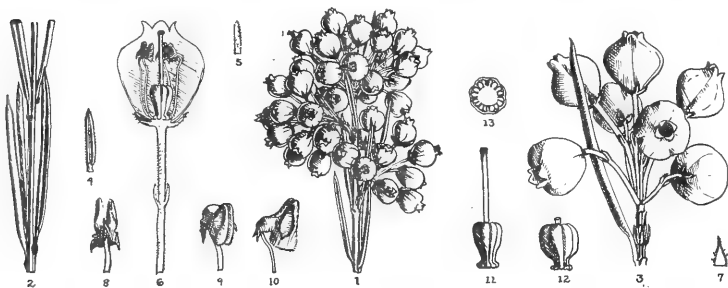


FIG. 9. *Erica sonora*. 1. Portion of plant $\times 1$. 2. Portion of stem $\times 2$. 3. Inflorescence $\times 2$. 4. Floral leaf $\times 5$. 5. Bract $\times 5$. 6. L.s. Flower $\times 3$. 7. Sepal $\times 5$. 8, 9, 10. Anthers $\times 10$. 11. Young gynaeceum $\times 5$. 12. Older ovary $\times 5$. 13. T.s. Ovary $\times 5$. (*Compton* 7214.) *Del.* M. Walgate.

also show the long-aristate anther. The locality of *E. sonora* is much further north than any recorded for *E. inflata*. The name alludes to the intermittently resounding waterfall from which Snorkfontein takes its name.

***Erica umbonata* Compton.**

§ *Arsace*.

Frutex erectus, ramosus. *Caules* glanduloso-pubescentes. *Folia* 3-nata, patentia, linearia, sulcata, obtusa, velutino-puberula, setis longis glandulosis paucis intermixtis. *Flores* numerosi, in fasciculis parvis, terminalibus axillaribusque. *Pedicelli* pubescentes. *Bractae* 3, basales, minutae. *Sepala* lanceolata, sicut folia induta. *Corolla* urceolata, sparse puberula, lobis tubo aequilongis, ore parum expanso. *Antherae*

manifestae, muticae vel minute aristulatae, ovoideae, obtusae. *Ovarium* depresso-globosum, 8-lobatum, parum puberulum. *Stylus* robustus, stigmate exserto, sub-peltato, umbonibus 4 ornatus.

An erect densely branched shrub. Stems glandular-pubescent with hairs of different lengths. Leaves 3-nate, patent, linear, sulcate, obtuse, closely velvety-puberulous with a few long spreading gland-tipped hairs, c. 5—7 mm. long, 1 mm. wide. Flowers numerous in small terminal and

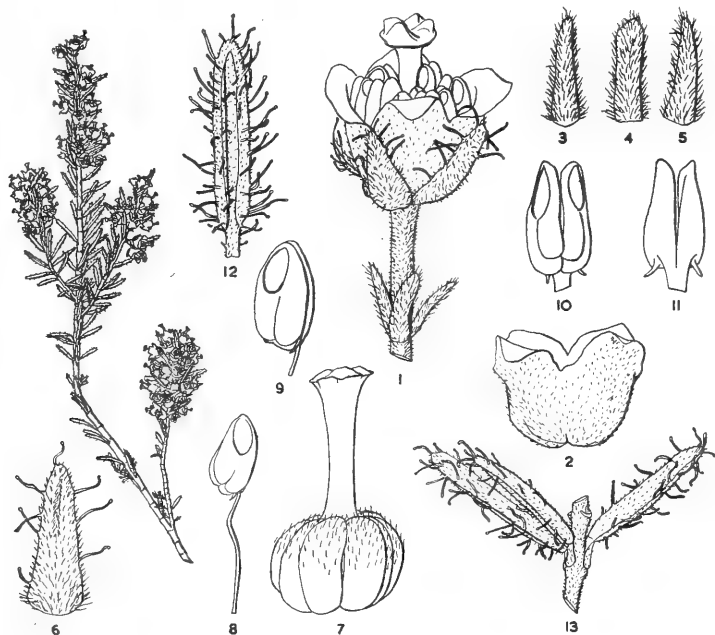


FIG. 10. *Erica umbonata*. Branch, natural size. 1. Flower $\times 10$. 2. Corolla $\times 10$. 3, 4, 5. Bracts $\times 15$. 6. Sepal $\times 15$. 7. Gynaecium $\times 15$. 8. Stamen $\times 15$. 9, 10, 11. Anther, side, front and back view $\times 20$. 12. Old leaf $\times 5$. 13. Whorl of leaves $\times 5$. (Compton 4036.) Del. L. R. van Niekerk.

axillary clusters. Pedicels pubescent, c. 1.5 mm. long. Bracts 3, basal, minute, c. 0.6 mm. long. Sepals lanceolate, c. 1.3 mm. long, pubescent with a few long gland-tipped hairs. Corolla urceolate, thinly puberulous, dull pink, c. 1.8 mm. long \times 2.0 mm. wide, slightly spreading at the mouth, the obtuse lobes about as long as the tube. Anthers manifest, muticous or very minutely aristulate, smooth, ovoid, obtuse, c. 0.6 mm. long, the pores about half the length of the cell. Ovary depressed-globose,

8-lobed, thinly puberulous above. Style stout, 1.5 mm. long, broadening distally to the exerted truncate stigma, which has four obtuse prominences.

Hab. Cape Province. Prince Albert Division: Seven Weeks Poort, 27 September 1932, *Compton* 4036 (*Type*, in Herb. National Botanic Gardens); same locality and date, *Barker* in Herb. Bolus 20627 (and in Herb. Kew).

This new species approaches *E. leucopelta* Tausch in many respects, especially the var. *ephebioides* Bolus, from which, however, it is well distinguished by the greater length of the style and the exerted truncate or sub-peltate stigma with its four prominent protuberances. So far it is only recorded from Seven Weeks Poort in the Little Swartberg range, where it occurs on shady rock-ledges.

SOME NOTES ON OXALIS MEISNERI SOND. AND OXALIS CANA SOND.

By

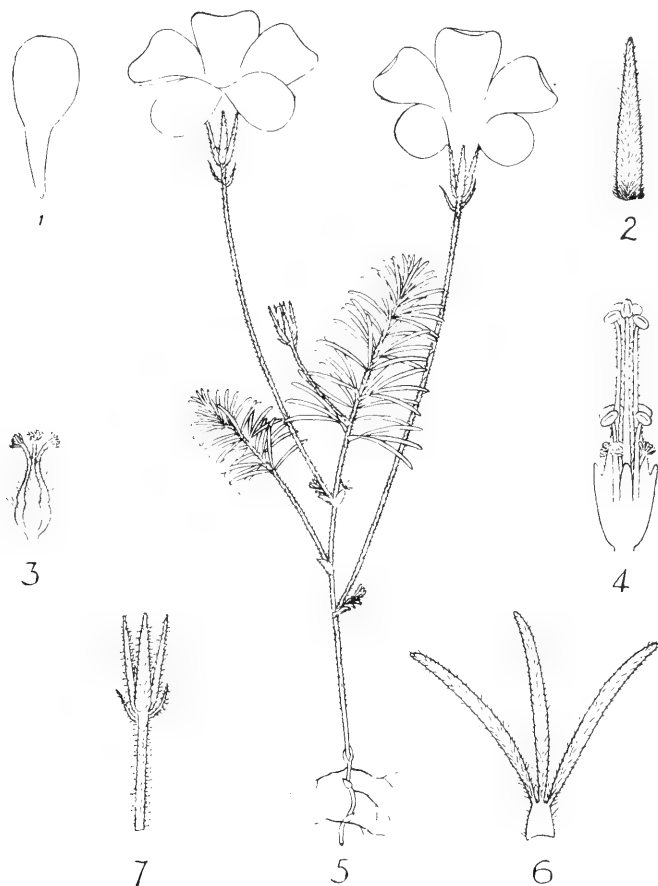
PAYMASTER CAPTAIN T. M. SALTER, R.N. (Ret.).

Oxalis Meisneri Sond., with pale violet flowers and gland-tipped hairs and *Oxalis cana* Sond., with yellow flowers and simple hairs only, are very local and not by any means well-known plants. They were first described by Sonder in Flora Capensis, Vol. I (1860), 345, where he observes that *O. cana* is "known from *O. Meisneri* by the shorter and densely hairy, not glandular leaves and yellow flowers." With this combination of differing characters before him, Sonder was very naturally misled into believing them to be different species. In his praiseworthy attempt to give an account of the South African Oxalis in the Flora Capensis, in most cases he had at his disposal very limited and poor material, often without bulbs, indeed *O. Meisneri* was probably only represented by the single specimen Krauss 1156 !, Tulbagh (*type*), which is now in Sonder's herbarium at Stockholm. *O. cana* was only known to him through Burke and Zeyher (un-numbered) !, Hex River (*type*), a locality which is believed to be false, for the plants almost certainly came from the vicinity of Tulbagh.* This collecting is represented in the South African Museum at Cape Town and several herbaria in Europe.

Later knowledge has disclosed the fact that *O. Meisneri*, the form with rather pale violet (*vide* Sonder rosy-violet) flowers occurs near Tulbagh, apparently more commonly, with simple hairs only and, indeed, I have been unable to re-discover the glandular or *type* form, though I admit that I have not been able to search the Tulbagh district very thoroughly. Further, the yellow-flowered form occurs in the Tulbagh district with the admixed comparatively long gland-tipped hairs of the typical *O. Meisneri*, those with simple and both kinds of hairs actually growing in association (*Salter* 2171) in pine woods about five miles south

* The localities given for Zeyher's or Burke & Zeyher's Oxalis between numbers 244 and 255, viz. Berg River, Hex River or Berg and Hex Rivers, in many cases seem to be erroneous and the tickets appear to have been written from memory some time after collecting. The plants in question are known to belong to two different floral regions and several of the species reputed to be from Hex River (as in this case) are only known from the Tulbagh district, whereas those which are recorded from Berg River are found to occur only in the Hex River district.

of Tulbagh. The violet and yellow forms, whether with simple hairs only or with additional gland-tipped hairs are, allowing for epharmonic variation, identical in all other respects, with similar ovoid-globose



Oxalis Meisneri Sond. (Form with simple hairs only.) 1. Petal, natural size. 2. Sepal $\times 3$. 3. Gynaecium $\times 5$. 4. Androecium $\times 5$. 5. Plant, natural size. 6. Leaf $\times 3$. 7. Calyx and upper part of the peduncle of the glandular form. (Salter 4536.) Del. T.M.S.

hard blackish-brown bulbs, up to 2 cm. in diam. The difference in the size of the leaves, mentioned by Sonder, is not constant. Sonder's use of the word "tomentose" in describing the indument of *O. cana* is, I

think, misleading, for the pubescence, though fairly dense, is not matted. The creation of these two species provides a typical illustration of the danger of species-making upon the evidence of herbarium "scraps."

It is therefore proposed that the two species should be amalgamated under the name *O. Meisneri*, a plant now with four known Forms, for I am opposed to giving them varietal names. Such variations as flower colour and the presence or absence of glandular hairs are common in the genus and, were they treated as taxonomically varietal, as has sometimes previously been the practice, the number of named varieties would become altogether unwieldy.

The stems in all the forms branch freely, often much more than shown in the accompanying figure of the violet-flowered form with simple hairs only.

It is to be hoped that the *typical* form has not been eradicated through cultivation and will eventually be re-discovered in the vicinity of Tulbagh.



BOOK REVIEWS.

E. V. WULFF: *An Introduction to Historical Plant Geography*. Translated by Elizabeth Brissenden. Waltham, Mass., Chronica Botanica Co.; Johannesburg, Juta & Co. American price \$4.75. 1943.

This valuable book, originally published ten years ago in Russia, has been brought up to date by the author and now reaches the English-speaking world in a quite admirable translation. Dr. Wulff is Curator of the Herbarium in the Dept. of Geography of Cultivated Plants, U.S.S.R. Institute of Plant Industry, Leningrad, and his work will increase the respect which Russian botanists have so justly won in the eyes of their colleagues in other countries.

It is understood that Dr. Wulff has two other books in a more or less advanced stage of preparation—one is a History of the Floras of the World, the other an account of the effects of human intervention in these floras. In this sense the present work may be regarded as an introduction: it cannot be considered an elementary text-book. It is a reasoned synthesis of a vast amount of detailed work, theory and speculation in a subject which is itself highly synthetic. It assumes a wide knowledge of distributional floristics, and may perhaps be criticised on the grounds of too little citation of the actual facts. A greater use of illustrative detail, although increasing the length of the book, would have made it more digestible.

The author deserves our thanks for making accessible much European literature, nowadays more difficult than ever to come by. (A postscript by Professor H. M. Raup adds many American references.) But he has two special claims to an important place in the development of the subject. One is the stress he lays on the historical basis of plant distribution. "Historical plant geography has as its aim the study of the distribution of plants now existing and, on the basis of their present and past areas, the elucidation of the origin and history of development of floras, which, in turn, gives us a key to the understanding of the earth's history. In this respect historical geography of animals and plants is a direct continuation of historical geology." We cannot understand present-day distribution without a knowledge of the facts revealed—however inadequately—by the study of fossil floras. Modern floras reflect the past history of the globe's climates and of its continents and oceans. It is fundamental to the argument that the dispersal and

spread of species is normally a very slow, difficult and orderly affair, conditioned by geographical and climatic change; and that evolutionary processes have made possible the enlargement of the climatic and edaphic ranges of groups with otherwise relatively small adaptability.

The other outstanding feature of the book is Dr. Wulff's whole-hearted acceptance of the Wegener theory of floating continents and their permanence, and his belief that in this is to be found the solution to distributional problems. Combined with the further theory of the secular change in position of the poles and the rotation axis of the earth, resulting in a corresponding change in the location of the warmer and cooler zones of its surface, the Wegener theory is shown to be capable of explaining many remarkable facts in the past and present distribution of plants. This demonstration makes perhaps the most enthralling section of the book, in spite of lingering doubts as to the chronology of continental fission in relation to the origin of the Angiosperms.

It is regrettable, though perhaps unavoidable, that Southern Hemisphere distribution receives comparatively little attention, in spite of its enormous interest—whether from the Wegener or from any alternative point of view. One could wish that in his forthcoming books Dr. Wulff will have more to say on the floristic relationships between the three widely remote southern land masses and the Antarctic continent.

This volume is the tenth to be published in the excellent *Chronica Botanica* "New Series of Plant Science Books," and cordial thanks and congratulations are due to the general editor, Dr. Frans Verdoorn. It is the most significant addition to plant-geographical literature since Willis' "Age and Area." We may hope that Dr. Wulff's two further volumes may receive the same worthy presentation to readers in English.

R. H. COMPTON.

L. C. KING. *South African Scenery*. 144 pl., 64 figs., 1 map. Oliver and Boyd. 1942. 3ls. 6d. C.N.A.

This book has to the plant student in South Africa three main appeals. Firstly, from the point of view of the Clements-Phillips school of ecology, the concept of the climax is circumscribed more clearly by such passages as "the study of present-day scenery and of various processes acting upon it has shown that no part of the earth's surface can be regarded as static in the sense that no part endures in its present form for an indefinite period" (p. 44). Taken in conjunction with the clear exposition of "Cycles of Erosion" developed throughout the book, it is clear that the orderly series of events constituting the development of the

climax take place against a background of a similarly ordered cycle of events culminating in a phase of equilibrium. To claim a possible correlation in time and space is not, unfortunately, possible, but one feels that the concept of the climax cannot continue to ignore the steadily changing topography which if not co-terminous is at least contemporaneous.

Secondly, there is for the student of plant geography, to whom our flora has presented so long a geographical puzzle, a ray of light in the demonstration that the mountainous escarpment has been present in more or less its present form, from at least early Miocene times. Coupled with Darrah's recent showing that "by Miocene times the forest types were strictly modern," this allows us to point to the eastern escarpment running up as it does through Rhodesia to Nyasaland and beyond, as a channel of migration.

Thirdly, there are several scattered points worthy of note. King recognises fully the cognate rôle of termites in Southern Africa to earth-worms in Europe but "on the whole, apart from alluvial valley plains, South African soils may be described as 'green.'"

The two bald statements—"A wattle plantation on the other hand is practically non-effective as an agent for arresting soil erosion" and "the wattle plantations of Natal with bare soil between the trees, are almost non-effective as retardants of erosion by rainwash"—cannot but interest those who attended the Imperial Forestry Conference of 1936.

Finally, the statement (p. 67): "Some idea of the importance of this factor may be gained from the following evaporation figures: Kimberley 87·65 inches, Northern Transvaal 75 inches and Southern Transvaal 60—70 inches per annum respectively. Other places are known where the amount exceeds 100 inches per year" makes one wish rather that the book were better referenced to original sources—perhaps the only real weakness of the work.

Recognising four Cycles of Erosion, the Arid, Marine, Glacial and Humid, King discusses these types with reference to Southern Africa—passes to discuss the topographic effects of eruptions (volcanic fissure subaqueous, etc.) and of land movement (uplift, depression, tilting and warping—refers to buried and ancient topographies "have been called . . . relicts"—and finally deals with the geomorphology of Southern Africa.

In time of war, new books tend to be rare, not only from a general diversion of interest to other spheres but also from a more practical shortage of paper and book-making facilities generally. Considerable credit is due to Dr. King and his publishers then for producing the present work, in that it lacks nothing in quality. We only regret its appearance in these times because inevitably it will not be as widely read as it deserves

for some years. For there is here a genuine contribution to South African " Natural History " which will find its reflection in most future discussions of the South African scene, be it from the botanical, biological or geographical points of view.

H. B. GILLILAND.

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ERRATA.

Vol. IX, p. 102, 13th line from foot of page, after *bracts* insert 2; *fertile bracts*



